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JOURNAL of FORESTRY

OFFICIAL ORGAN OF THE SOCIETY OF AMERICAN FORESTERS

A professional journal devoted to all branches of forestry

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The Society is not responsible, as a body, for the facts and opinions advanced in the papers published in it. Editorials are by the Editor-in-Chief unless otherwise indicated and do not necessarily represent the opinion of the Society as a whole. The "leaders" preceding major articles are to be regarded as editorial additions.

EDITORIAL

FORESTRY IN THE SOUTH

MANY OF THOSE who attended the 31st annual meeting of the Society at New Orleans late in December came away with the conviction that the substantial beginnings made in forestry practice in the South are but small forerunners of future accomplishment. At the same time it was evident to them that, even in the South, forestry requires that the sum total of all such factors as land cost, climate, soil, species, labor and markets and the possibility of diversified and close utilization, must be favorable before it can be practiced as a business.

Forestry in the South, of course, received a large share of the attention of the meeting. The South probably has more genuine, large-scale forestry accomplishment to its credit than any other forested region in America. The initial paper concerned the financial aspects of forestry in the South and showed that, given favorable soil and climate, protection against hogs and fire and a reasonable tax system, well stocked stands of longleaf or slash pine show promising financial possibilities to private capital. Discussion that followed made it clear that each property presents a problem of its own, and that the fact that the land was once forested is no proof that a new forest can be raised at a profit. An important gap

was also evident in southern forestry that must be plugged before advance on a wholesale scale can be expected. This gap is the absence of sufficient fundamental information, particularly of the empirical kind, and too limited high grade extension work to acquaint the large and the small landowners with the principles of forestry, its technic and economics.

The small saw mill situation was ably described and discussed at the meeting by a representative of the Southern Pine Association. There are 10,000 of these mills. They produce one-half of the lumber cut of the South, and they present acute conservation and lumber marketing problems. Without some forestry control the small mill wipes out the possibility of future forests more effectively than the large mill. Here is a problem *par excellence* for the southern foresters and extension specialists.

Two lumbermen, one of them the South's pioneer large-scale forester, described their forestry activities. A third forestry operation, the largest in the region, was actually visited on an all-day field trip, and proved to be a most impressive demonstration of what southern soil and climate can do in growing pine. Such lumbermen are the real dirt-foresters of the South. With little technical aid at the start they ventured into an

untried field, were successful, and are now pointing the way for others.

In all great things there must be leaders who act on their convictions. For example, sixty years ago or more, when the band saw was first suggested as a better machine than the circular saw, the band-saw enthusiasts made little progress until a few venturesome saw mill operators actually tried out the new device to prove to themselves whether or not the attractive claims were valid. The first installations were failures, but the few saw a germ of good in the machine, studied it, and improved it. The saw mill men themselves, more than the zealous machinery manufacturers, made the band saw a success. Once its success was proved, the other operators followed suit in quick order.

So it apparently will be with forestry. An enthusiast sows the idea. It catches the ear of a receptive landowner and is tried out. Neither is certain as to the outcome. Unforeseen problems, and perhaps advantages, develop at once. No

time for generalizing now. Each problem must be tackled and solved in the order of its appearance. If there is a manifestation of good in the idea it will not be dropped. If successful, it will attract others. The significant thing in this analogy is that *someone must try out the new idea*. We need many more practical examples like those of Henry Hardtner, the Industrial Lumber Company, the Great Southern Lumber Company, the Superior Pine Products Company and the Crosssett Lumber Company. Theirs are more effective demonstrations of what can and what cannot be done than a carload of documents and a generation of preaching.

As the adoption of forestry widens, the practitioner will uncover many problems that the research man must solve. Not until this happens will research follow in a more realistic direction. There is no appreciation of the problems at present, simply because there is not sufficient practice to reveal them.

ADDRESS OF THE PRESIDENT¹

By PAUL G. REDINGTON

President, Society of American Foresters

The retiring president reports gratifying progress in the strengthening of the Society's membership and finances and increased influence in matters related to forestry. He discusses the Society's participation in such national affairs as land utilization and the disposition of the public domain insofar as forestry and watershed protection are concerned as well as the stabilization of the forest industries through the Timber Conservation Board, in all of which the Society is represented.

WE ARE VERY HAPPY that it is our privilege to meet with the foresters of the great Southland. Many of us are not fully aware of what has been going on in forestry in this region and therefore expect, during the sessions to learn much concerning the problems that exist here.

GROWTH OF MEMBERSHIP

In this time of economic stress—which is indeed trying to men's souls—it is a great satisfaction to be able to report to the members of the Society of American Foresters that our organization has prospered—both as to membership and finances.

I think it is important to give you some details in respect to the above statement. The Society, in November 1904, consisted of 7 members. Since then, it has grown to over 1,900 members at the end of this year (1931). In 1927 the membership was 1,322 and in 1931 it was 1,922—a net gain of 600 members. This figure is significant when we consider that about 160 members were lost during these years because of non-payment of dues, deaths, and resignations.

The 1931 record is as follows: The Society added 233 new Junior Members. Forty were advanced to Senior Membership and 3 Juniors were reinstated. There were dropped from the membership roll

27 for non-payment of dues (3 Seniors and 24 Juniors). We lost 7 through death (5 Seniors, 1 Junior and 1 Associate). Twenty members resigned from the Society (7 Seniors, 12 Juniors, 1 Associate). This represents a net gain of 182 members.

The membership as of December 1 is as follows:

Fellows	12
Seniors	731
Juniors	1108
Associates	50
Corresponding	8
Honorary	13
	<hr/>
	1922

While I believe we should all be gratified over the steady increase in membership, and while it is known that many of the Sections have aggressively gone after new members, we should not rest on our oars. It is definitely known that there are over 4,000 technically trained foresters in the United States and Canada. In addition thereto are many individuals lacking the educational qualifications but amenable to membership because of long practical experience and deep interest in forest work.

Mr. W. R. Hine, our former Executive Secretary, was primarily responsible for starting the move to canvass the field for foresters eligible to membership, but

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

not then enrolled in our ranks. The present Executive Secretary, Mr. F. W. Reed, plans to build on Mr. Hine's work. He will explain briefly to you his plans in this matter and discuss some membership problems. With coöperation of all Sections and individual members, we should strive to reach a goal of at least 3,000 members by the end of 1933.

FINANCIAL STATUS STRENGTHENED

The financial status of the Society is excellent considering the parlous times the country has experienced. You will all be interested in the Treasurer's report. Briefly, in 1930 we had to go into our surplus to the extent of approximately \$1,200 to help in carrying on the work of the Executive Secretary. However, 1931 portrays a different picture. It was not necessary to touch the surplus despite the fact that it was anticipated to do so each year of the permanent secretary project. As a matter of fact, we were able to meet all our obligations and transfer a small amount to the reserve fund. The budget for 1932, approved by the Council, indicates that we shall not only proceed on an even keel but be able to transfer to the reserve funds an estimated amount of \$2,500.

A call was made in 1929 for voluntary contributions from the membership to support the permanent secretary project for a three-year term. The total expense in 1931, as indicated by the Auditor's report, for the permanent secretary was \$7,437.31. Actually this office is costing approximately \$10,000 (as previously estimated) which is reflected in increased general expense. In order to function properly, we should be able to count on \$10,000, the amount suggested in our call for funds. There has been but very slight delinquency from pledges to this fund. It is hoped indeed that members' contributions for this project will continue to come in until the end of the

three-year period, March 31, 1933.

With the gratifying increase in membership, with great possibilities for securing additional advertising, with economies which may accrue in the normal conduct of the Society affairs, we hope it may be possible in 1933 to support the permanent Executive Secretary position from current revenues.

HEADQUARTERS STAFF EFFICIENT

The establishment of an Executive Secretary's position has greatly forwarded the progress of the Society. The officers who previously had to concern themselves with many details have been relieved of what constituted onerous work in addition to their own personal or official affairs. The Executive Secretary, under general approval of the Council, handles directly, with the aid of Miss L. A. Warren, Business Manager, the great mass of work of the parent organization. We all, I believe, should be happy indeed in the realization that we have a hard-working, efficient force on the job in Washington and my personal respects are herewith tendered to every member of our official staff, all of whom do their part in full measure.

You will all be glad to know that the condition of Mr. W. R. Hine, our first Executive Secretary, who resigned because of ill health and is now in the Veterans Hospital at Oteen, North Carolina, is very greatly improved.

UNEMPLOYMENT AMONG FORESTERS

The Executive Secretary has before him a list of 100 foresters who at this time are out of employment. The Society would be remiss indeed if it did not give thorough consideration to this situation. I urge that Sections canvass the field of forestry in their realms of influence for possible openings and keep in close touch with the Executive Secretary. Mr. Reed will have

something to say on this matter in his report to this annual meeting.

FOREST POLICY ADOPTED

The Society has in 1931 recorded its verdict as to a forest policy for the United States. The total number of ballots received was 839. Every one of the nine statements of principle and their subdivisions were given a strong majority support. While only approximately one-half of the membership voted, the strong majority vote certainly indicated that members could think alike on the principles presented to them for consideration. The result, in my opinion, relegates to the realm of innocuous desuetude those doubting Thomases who insisted that it was impossible to secure constructive thought and action on a subject of such great complexity.

LAXITY IN VOTING

I do not like to draw any invidious comparisons in reference to the vote. Suffice to say, however, that the Junior Members outvoted the Senior Members by a large majority. It is just too bad that so many highly trained and experienced foresters, members of the Society of long standing, after being given every opportunity to thoroughly consider the preliminary presentations of the committee, should have failed to make any record of their opinions.

To digress for a minute—I would also call your attention to the fact that in the recent vote for Society officers, only one-half of the members cast their ballots. I will leave it to all of you to judge whether or not this pictures a healthy condition of affairs. Is it possible that one-half of our members do not see the inherent potentialities of united opinion and strength as a working force to let the world know where the membership stands.

POLICY RECOMMENDATIONS

Following the vote on the forest policy, the Executive Committee of the General Committee submitted their recommendations as to action on the report. The recommendations were as follows:

That special committees be appointed to study and report on—(1) Fire control. (2) Public domain matters. (3) Public forests and protection forest zones. (4) Stabilization of the forest industries. A majority of the General Forest Policy Committee approved these recommendations, and the question of the appointment of the committee to handle these matters will be considered by the Council and it may be possible to announce the action taken by the Council before adjournment of this meeting.

PUBLIC DOMAIN PROBLEMS DEMAND ACTIVE INTEREST

We have now for consideration the impending proposals made by President Hoover's committee for the disposition of the lands of the public domain, an area of 179,000,000 acres, the dregs, if you please, which were left from the bountiful overflowing land-law cup which distributed prodigally to homesteaders and other lands thought to be suitable for farming, stock-raising and the like. It is not too much to assert that this area of 179,000,000 acres is of no value to the homesteaders, else it would have been taken up long ago. It has been of interest to the stockmen ever since sheep and cattle were brought into the western country. It has received but slight administrative attention from the federal government, truly still a no man's land where the policy of first come first served and the devil take the hindmost has held sway. Overgrazing of ranges has been the order of the day. Vegetative cover of palatable forage plants has largely disappeared because of misuse of the range

and has been supplanted with inferior types of plants largely useless to the ruminants now using it. But this is not the saddest part of the picture. Soil erosion has followed rapidly behind the loss of vegetative cover and I doubt if any human being could make an intelligent guess as to the millions upon millions of cubic yards of top soil that have gone down to the sea in the past sixty years. Within the memory of man much of the landscape has been made over from a thing of utility to a desert, cleft by great and deep arroyos that serve as the efficient medium of the discharge of the torrential rain-waters which in their progress annually gouge out wider and deeper channels.

A bill is before Congress to distribute these public lands to the respective states in which they lie, with conditions. The preamble of the bill is as follows:

"To grant vacant, unreserved, unappropriated, non-mineral lands to accepting states and to authorize the President to establish national ranges in non-accepting states; to create a board authorized to determine as to the disposition of certain areas of public domain; to enable the United States, the states and individuals to exchange lands for the consolidation of mingled areas and granting lands to certain states to achieve that purpose; to provide for the control, disposition and protection of stock watering places and of intrastate and interstate stock driveways, and for the conservation of grazing resources and for other purposes."

It is not possible to consider here or to speak fully concerning all that the bill proposes to do. We should, however, take a brief time to deal with those provisions which relate to the handling of forests:

"Section 6. There shall be excepted from the grant made in Section One of this Act, the areas of vacant, unreserved, unappropriated public lands depicted and described on that certain map or plate

known as Map No. 1 and entitled 'Areas Proposed by Forest Service as additions to Existing National Forests or for Establishment of New National Forests,' as that said Map No. 1 appears of record and on file in the General Land Office until such time as it shall be determined, as hereinafter provided, what shall be added to the national forests from the vacant, unreserved, unappropriated public lands so shown on said Map No. 1, and when such determination has been made the lands remaining shall pass to the accepting states as provided in Section One.

"Section 7. There is hereby created a board for each public land state having within its boundaries in excess of four hundred thousand acres of vacant, unreserved, unappropriated public lands at the date of the approval of this Act, which shall be composed of five members, one appointed by the President of the United States, one by the Secretary of the Interior, one by the Secretary of Agriculture, and two by the Governor of the State.

"It shall be the duty of said board, within one year from the date of the approval of this Act, to determine and report to the Secretary of the Interior (1) what if any areas of the vacant, unreserved, unappropriated public lands shown in Map No. 1 should be added to existing national forests, (2) what if any areas not chiefly valuable for forest purposes, including watershed protection, within existing national forests should be returned to the public domain, (3) what consolidation of areas can be brought about to correct and round out the boundaries of national forests, (4) what reservations or withdrawals of areas of the vacant, unreserved, and unappropriated public lands should be made for national defense, reclamation purposes, reservoir sites, national parks and monuments, airports and beacon stations, and migratory bird refuges.

"Lands in each state not included in existing national forests under (1) and excluded from existing national forests under (2) shall be and become included within the terms of the grant in Section

One of this Act and shall pass to accepting states as therein provided."

I want to call particular attention to the proposals made in Section 7 as to the functions of the board which if this bill were passed would be the determining body as to additions or eliminations to the national forests.

It would be of course presumptuous for any one to anticipate the action of such a determining board. In the Garfield Committee's report it was stated:

"1. That all portions of the unreserved and unappropriated public domain shall be placed under responsible administration or regulation for the conservation and beneficial use of its resources.

"2. That additional areas important for national defense, reclamation purposes, reservoir sites, national forests, national parks, national monuments and migratory bird refuges should be reserved by the federal government for these purposes."

Unfortunately, No. 2 above does not specifically cover watershed protection as such. Watershed protection of course is one of the objects for which national forests are created, and it plays a very important part in the protection and success of reclamation projects and reservoir sites. Policy No. 2 therefore should be made broad enough in its scope to retain under federal ownership all areas, regardless of cover, which are important in the protection of watersheds for the conservation of water and soil fertility, whether by national forest withdrawal, reclamation withdrawal, withdrawal for reservoir sites, or as national ranges.

The general public interest obviously requires that the additional reservations contemplated by No. 2 above should be made before any disposition of unreserved and unappropriated public domain lands is made to the state or other agencies. It is important, therefore, from the forest conservation point of view, that existing national forest units be

safeguarded against ill considered action and that areas of the public domain suitable for the purpose and susceptible of effective administration with the existing national forests be added to them. Since national forests serve a national interest, decisions affecting them should be based upon national considerations, and great weight given to the judgment and recommendation of the federal agencies most competent in the field of national forest conservation. The Department of Agriculture is without question the most competent agency to pass upon the suitability of lands for national forest purposes.

By the Acts of June 4, 1897 (30 Stat., 11) and of March 3, 1891 (26 Stat., 1095), the President of the United States had the authority to create national forests and to change their boundaries. In taking this action the President acted upon the recommendation of the department concerned, although the law did not so require. Congress subsequently restricted the creation of additional national forests by the President so that the authority now remains with the President only as to national forests in the States of Utah and Nevada.

In the Act of June 7, 1924 (the Clarke-McNary Act) recognition is given (Section 8) to the need to determine "the location of public lands chiefly valuable for streamflow protection or timber production which can be economically administered as parts of National Forests." Authority to make this determination is given to the Secretary of Agriculture by that Act, the Secretary's report of findings to be submitted to the National Forest Reservation Commission and the Commission to report its conclusions to the President, who, in turn, is to lay the findings of the Commission before Congress.

The large public value of the national forests and the success of their administration is attested by the President's com-

mittee. There are no substantial grounds on which to claim that the national interest is not well served and the local interest not adequately protected by the policy of the Department of Agriculture in its administration of the national forests, including its judgment on the character of lands to be comprised within national forests. The Department has not only shown competency in this respect but it has shouldered responsibility for its actions.

The judgment is, therefore, that the national forests can be made to serve their highest use and be most adequately safeguarded if additions to and eliminations from them are made by proclamation by the President of the United States upon recommendation of the Secretary of Agriculture. I believe that the Society can also well take this point of view.

You will be interested to know that the American Engineering Council has appointed a committee of seventeen to consider many problems which come up in connection with the proposal for the distribution of the public domain lands.

SOCIETY REPRESENTED AT LAND UTILIZATION CONFERENCE

It will be of interest to you in this connection to know of some of the conclusions reached by the National Conference on Land Utilization held in Chicago, Illinois, November 19 to 21, 1931. Mr. Reed attended this meeting and served as a member of the Committee on Resolutions.

"Recommendation No. 1: *Administration of public domain*. It is recommended that in order to obtain conservation and rehabilitation of the grazing ranges of the public domain these lands be organized into public ranges to be administered by a federal agency in a manner similar to and in coordination with the national forests. Such public ranges should include lands withdrawn for minerals or for other purposes when the use of such lands for grazing is not incon-

sistent with the purposes of withdrawal."

"Recommendation No. 2. *Watershed Protection*. It is recognized that throughout the Rocky Mountain Regions and the Pacific Coastal Region hundreds of communities are directly dependent on nearby watersheds for their supply of water for irrigation and other purposes and in many cases this dependence is interrelated in scope due to the watersheds being in one state and the irrigation use in another state, and also due to the fact that the irrigation water of one state must often be stored in another state. Inasmuch as these facts can not be changed, due to the geography of the region, it is recommended that lands valuable for watershed protection should be administered under the supervision of the federal government."

"Recommendation No. 13: *Public Retention or Acquisition of Land*. After every effort has been made to promote a sound type of private utilization, there will remain extensive areas that are not adapted for private utilization or that for one reason or another should be under public ownership and management in order to prevent their misuse or for other reasons. With the exception of small areas acquired for special requirements, federal land acquisition through purchase at present is confined to the following main purposes:

"1. Forest lands for the protection of the head waters of navigable streams.

"2. For growing timber (at present limited by appropriation and tacit understanding to the establishment of small areas of demonstration forests mainly in the South. The total program for this and the first-mentioned purpose is only about 15,000,000 acres).

"3. Bird and game refuges under the administration of the Biological Survey.

"4. National parks and monuments (except for the reservation of land from the public domain, these are being developed partly on lands contributed by non-federal agencies).

"State land acquisition is confined mainly to the establishment of state parks and/or state forests; but the scope of this

activity is not very considerable outside of New York, Pennsylvania and the Lake States.

"There appear to be a number of important objectives in public acquisition, in addition to those mentioned, some mainly of local interest and others of broader application as follows:

"1. To withdraw from private ownership tracts occupied by sparse and scattered population, in order to economize state and local expenditures for public service.

"2. To provide for the permanent maintenance of local forests on which communities are dependent or may become dependent for part-time employment, markets, supplies of raw material for local industries, fuel, posts, and other supplies for farmers and other residents of the community, local refuges for game and other local centers of recreation.

"3. To remove from private ownership lands that are periodically brought into temporary cultivation under the stimulus of high prices or favorable yields but are incapable of permanently profitable utilization, in order to remove the unfair competition of such lands to the established farming industry and to prevent the serious wastes and hardships incurred by their occupants after the temporarily favorable conditions have passed.

"4. To remove from private ownership lands that can not be utilized profitably by private individuals or concerns without serious wastage of the soil through erosion or other causes."

Recommendation No. 15 concerns itself with a land classification program. There is not the time here to go into it at length, but the recommendation is strong in urging a well directed land classification for the entire country.

This Land Utilization Conference took a very broad view of the entire land situation. A digest of the whole report by Mr. Reed appeared in the January *JOURNAL OF FORESTRY*,² page 115.

TIMBER CONSERVATION BOARD AIDED BY SOCIETY

As many of you will recall, one of the principles adopted in the Society's national forest policy was to the effect that there should be created an organization to aid in the stabilization of the forest industries. It was created by the President. The appointment as a member of the Board of the President of this Society, and the invitation to many other members to serve on the Board's Advisory Committee is in recognition of the aid and coöperation that the forestry profession can and must give in the solution of this all important problem. Now that this Board has been established it is one of our functions to coöperate in every consistent way with it since problems confronting the lumber industry relate back in many ways to the forest problems in the United States.

The Timber Conservation Board has held three meetings: One last winter for organization purposes; one in June to consider recommendations from its Advisory Committee; and the third in November.

The Council of the Society indicated its desire that the Executive Secretary should aid the Timber Conservation Board to every reasonable extent and Mr. Reed has been in close touch with the Secretary of the Board. It is significant that at the last meeting of the Board it considered from three members of its Advisory Committee three matters of particular interest to foresters: The report of Col. Henry S. Graves on the public forest ownership policies; the report of David T. Mason on a program for sustained yield; and a report from Dr. Fred Fairchild in charge of the taxation inquiry for the Forest Service. Mr. Reed will undoubtedly refer briefly in his report to his contacts with the Secretary of the Board. In addition

²Portions of the principal papers read at the Conference appeared in the February issue.—Ed.

thereto we are very happy to have with us as a speaker Mr. Ripley Bowman, the Secretary of the Timber Conservation Board, who will, I am sure, give you an interesting size-up of the program before the Board.

COÖPERATION WITH AMERICAN ENGINEERING COUNCIL

I am also very happy to report that the Society has the coöperation and receives the benefit of the views of the American Engineering Council, in reference to the flood control situation and, as stated above, this Council also is investigating phases of the public domain question. It is expected on request that the Executive Secretary will be in attendance at these Congressional hearings to give the Society's views on forest, public domain and flood control matters.

ACKNOWLEDGMENTS

I will, before the end of this meeting, deliver over the President's gavel to my successor, C. M. Granger. If he has as interesting and pleasant experiences as the present incumbent has enjoyed he should be happy indeed. I prophesy real achievement under his direction of the affairs of the Society.

The present Council members have been helpful indeed in all those matters which have to be considered by that body and to them I convey my grateful thanks.

I have also had the privilege of several direct contacts with the Editor of the JOURNAL OF FORESTRY who has handled his difficult voluntary task with great credit. More power to him.

The committees have worked zealously to discharge their obligations, and the membership I believe appreciate—as I do—their labor of love.

Finally, to the Sections which are the real mainstays of this Society I want to express appreciation of their coöperative attitude and my delight and pleasure in having been enabled to meet with many of them in conclave throughout the past three years.

SOCIETY A POWERFUL FORCE

We have in our members an inherent powerful force—lacking serious dissensions—that can remove the mountains which rise up at times to impede the steady forward progress of the forest movement in this country. We have no place in this Society for inferiority complexes. We have grown to manhood, but there are many who do not realize this. It is high time to comprehend the change and push aggressively forward individually and collectively in the moulding of our policies and their interpretation throughout the land. Others are looking to us more and more every year for constructive leadership. We must not fail them.

ADDRESS OF THE PRESIDENT-ELECT¹

By C. M. GRANGER

President-elect, Society of American Foresters

The Society is fortunate in having for its new president a man of long and varied experience and responsible assignments. In his inaugural address, of which this is but a brief part, he found much to commend and sees the job ahead as requiring sound economic thinking and planning.

ONE CAN not fail to be impressed with the responsibility and honor that goes with election to the presidency of this Society. I am very much aware of it. President Redington and those who preceded him have set a very high mark for their successors to aim at.

I think few of us realize how much the Society has grown in numbers until we heard President Redington give the figures, nearly two thousand members.

While we have been growing numerically, we have also gained stature—the Society has come to manhood. My mind goes back to an annual meeting of the Society nearly ten years ago. The Clarke-McNary Bill was then being presented to Congress. The Society had no collective opinion about the measure—one of the great pieces of fundamental legislation for forest protection. The meeting could not take any action which would make the Society's voice heard on the bill. Instead it was proposed that each individual member send his views to Senator McNary.

Contrast this with the way the Society acted on the McSweeney-McNary Act of 1928, another of the outstanding legisla-

tive cornerstones of the forestry structure. In this case the Society sponsored the Bill, unitedly pushed it, and thus became part of a historic movement which put the Act through the same session of Congress in which it was introduced—which surprised even the bill's authors!

You have heard at this meeting, from those outside our ranks, a high appraisal of the standing and strength of foresters as a group. Similar testimony from other sources as to the powerful influence which the profession has exercised constructively and can continue to exert has been coming to my attention. All this should impress us with the need to use our force wisely, to make certain we build soundly as we go ahead with our program.

In the early days of which Dr. Schenck has just been reminiscing, forestry was a high ideal, carried forward by crusaders led by the men who have just been mentioned. In a sense forestry is still a crusade, but its success depends more than ever on sound economic thinking and planning. We have much work ahead of us. I am very happy to serve in this task.

¹Presented at the 31st annual meeting banquet of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

THE FOREST SURVEY IN THE DOUGLAS FIR REGION¹

By H. J. ANDREWS

Senior Forest Economist, U. S. Forest Service, Portland, Oregon

The initiation in the Douglas fir region of the great nation-wide forest survey and its progress to date has been followed by foresters with the greatest interest, and many inquiries have been made as to the technic being employed. In this article, Mr. Andrews, in charge of the forest survey in the Douglas fir region, gives a resume of the problems met with in drawing up the plans for the survey, such as judging the value of existing data, the standards of cruising methods to be adopted and the classification systems for forest types, accessibility zones, and ownership groups. He describes the plan adopted and how it is applied in detail. His paper is limited largely to the inventory phase of the work.

IN DEALING with any problem as large and complex as the administration of the forest lands of the United States, both private and public, there is need for both complete and reasonably accurate facts as to what forest resources we now have on hand, how fast they are going, what growth we are getting, and lastly, just how much wood we really need.

Without all the facts and with those facts at hand often inaccurate, it is but human for different people to generalize from different particulars and to come to radically different conclusions about the same subject. Any one who has studied the present forest situation and is conversant with the many divergent points of view as to what needs to be done, when, how, and by whom, can draw his own conclusions as to how much of this divergence in points of view is due to a lack of adequate basic facts.

Recognizing the need for these basic facts about the forest resources and lands in the United States, Congress provided for a forest survey in the McSweeney-McNary Forest Research Act of 1928. The total authorization for the entire country was not to exceed \$3,000,000. It was only natural that the Pacific Northwest, with its large and valuable remaining stand of virgin timber, its chronic overproduction of

timber, and its resulting lumber industry problems should be the region for initiating the Survey. This region, for the purposes of the Survey, consists of that part of Oregon and Washington lying between the summit of the Cascade Range and the Pacific Ocean.

The organization for handling the Survey was built from the ground up. During the summer and fall of 1929, the first men were selected and more were gradually added until by the summer of 1930 the full survey organization was completed. Personnel was obtained by transfer from other branches of the Forest Service, from existing Civil Service registers, and by holding special examinations.

At the initiation of the work the first big job was the definition of objectives. In other words, to translate the broad wording of the statute into definite objectives and then to work out plans, specifications, and technic for securing these objectives. The scope of the Survey was such that it was divided into four major phases: inventory, growth, depletion, and requirements.

The principal objectives set up for the inventory phase were to secure:

1. An estimate of the present timber stand by species and by ownership groups within certain geographic units.

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

2. A statistical summary of forest types by these same ownership groups and geographic units and, in addition, a type map of the region if such could be obtained within the cost limits of the Survey.

3. A classification of the present stand according to its accessibility for exploration.

4. A classification of the forest area according to its productive capacity or, in other words, a site classification.

The depletion-phase objectives were to secure the average annual or periodic rate of depletion by cutting, fire, insects, and disease. The growth phase objectives were to secure actual growth of virgin and immature stands under present conditions and also to estimate the actual and possible future growth in the region. The requirements—phase objectives were to determine present local and national requirements in forest products and probable trends. The inventory phase calls for by far the largest expenditure of time and money, more than all the other three phases together, and this paper will deal principally with this phase, especially since this is the only one for which, to date, complete plans and procedures are in effect.

Before the final working plan for the inventory phase could be drawn up, a large number of definitions and standards had to be set up, such as type definitions, standard minimum merchantable logs and trees for timber estimates, adequacy of existing volume tables, ownership classifications, definition of accessibility zones, minimum size of type areas, size and location of geographic units for releasing data, and a host of minor details.

While these items were being threshed out the question arose as to whether the so-called "compilation" or "in place" method or the strip method as carried out in recent Scandinavian timber surveys should be used. It might be well at this time to state just what the term "compilation method" implies in this region.

When the survey was initiated it was believed that information of one sort or another was existent for the bulk of the merchantable timber areas in the region. There were the large number of cruises for much of the privately owned merchantable timber, many of the counties had cruised all their assessable timber for tax purposes, the states had cruises on considerable areas of state land, the General Land Office had cruises for all the Oregon and California railroad land grant areas, the Indian reservations had cruises on their holdings, the Forest Service had extensive reconnaissances and type maps for all the national forests and intensive cruises on portions of most forests, the forest fire associations had type maps, there were aerial photos available, and there was always the personal information of the many individuals connected with the industry and protective associations.

If all these data could be assembled and used and the areas having no existing data could then be covered by field work, it seemed possible to have the region covered "in place" with all the advantages that go with localized statistics and maps. It was admitted that it would take considerable field work to correct and adjust the existing timber data to one common standard and also to get data for those areas not covered to date by any office records, but it was thought that this was possible within reasonable cost and time limits. No one connected with the Survey realized at the outset just how much checking would be necessary to adequately adjust existing data or how many areas were not covered by usable data.

There were and still are adherents of both methods, and there are certain advantages and disadvantages to both methods. It must be kept in mind that in the case of the Survey the total authorization of Congress (which is not an appropriation) was for not to exceed \$3,000,000 or something between $2/3$ and $3/4$ cents per acre for all the forest land in the country.

Even though certain forest regions might be entitled to a somewhat larger per-acre allotment than others, they could not expect to secure much if anything over about one cent per acre.

Were cost not an item, there could be no debate about method because type maps and estimates, description by description, could be carefully and accurately made and the "in place" value of these would far outweigh any mere statistics gathered by crossectioning the region. However, with cost an item and with this cost ranging somewhere in the vicinity of one cent per acre, there were many people who wondered if a compilation of existing data plus the mapping in place of those areas not covered by existing data would give sufficiently accurate volume figures and type maps. They felt that the Scandinavian timber surveys where accurate timber statistics but no localized type maps had been secured at low per-acre costs were proof that accurate statistics as to both timber volumes and type acreages could be obtained for one cent per acre or less. It was difficult to compare costs of the two methods since it must be kept in mind that other things being equal, the per-acre costs of strip surveys varies with the size of the geographic unit for which data are to be presented. For example, if data were desired for areas the size of the smaller counties in the Douglas fir region, the cost per acre might be three or four times as great as though data for a state as a unit were desired. Even with the so-called "compilation" method, it was apparent that the size of the release unit would have some bearing on the accuracy of the results and, therefore, indirectly on the cost. The smaller the release unit the less accurate will be the figures or, conversely, the larger the release unit the more chance there is for minor errors to compensate. However, the size of the release unit plays a much more important part in per-acre costs for a strip job than for a compilation job.

All through the discussion on methods, no one argued that the more localized statistics and the type maps obtainable by the compilation method were not more useful and valuable than the cold, non-localized statistics obtainable by the strip method. The important question was, would they be of sufficient accuracy.

It was decided to give the "compilation" or "inplace" method a good tryout and so work was started on this basis. As stated before, the first job was to set up certain standards and definitions. One of the first problems was to decide what ownership classes should be used, inasmuch as a mere compilation of the total timber volumes and type areas in the region, without stating the private and public ownerships involved, would give not only misleading but less useful data than if the important ownership classes were segregated. The following ownership groups were decided on:

1. National forest reserved for some specific purpose.
2. National forest not reserved for some specific purpose.
3. State, county, and municipal reserved for some specific purpose.
4. State, county, and municipal available for conversion.
5. National parks, military reservations, etc.
6. Indian reservations.
7. Public domain.
8. Revested land grants (Oregon & California Railroad).
9. Privately owned lands.

Another problem was what geographic units should be used for releasing data. The county seemed the feasible unit for making assignments to field men and for working up both volume and type data. There are many reasons why the county should be the logical geographic unit for the presentation of the data gathered by the Survey. However, many timberland

owners in the region did not relish the idea of having new timber volume figures presented county by county because of their fear that new tax problems might be involved and that new county cruises for which they would have to pay might be demanded. It was suggested that volume statistics be released for groups of counties such groups to be natural, economic units within which were situated milling facilities to take care of the logging in the group. It is, of course, impossible to so group the counties in the region that logs from one group or unit might and will not be transported into another unit for manufacture. However, eleven such units were set up, using county lines for boundaries in all but a very few instances and the boundaries of the units seemed to suit the majority of people consulted. To date no final decision has been made as to whether volume figures will be released by individual county units or by these so-called "economic release units."

Cruising standards was another question to be settled. It was decided that the sawtimber content in board feet by the Scribner rule would be obtained for all merchantable trees and that for conifers all trees making *at least* one 32-foot log with a top diameter of 12 inches would be considered. The smallest hardwood tree considered is one which will make an 8-foot log with a 10-inch top. In addition, the entire solid wood content in cubic feet of all trees down to 6 inches d. b. h. is to be obtained. This will omit bark, low stumps, and all rotten material. These figures in cubic feet will be obtained by applying correction factors to the adjusted board-foot figures and by the use of modified yield tables for immature stands. Twenty-two conifers and ten hardwoods were recognized for the region and Douglas fir, as the most important species in the region, was divided into four sub-classes based on size and age, namely, trees over 40 inches d. b. h., old-growth trees 20 to 40 inches d. b. h., young-growth trees 20 to 40

inches d. b. h., and trees under 20 inches d. b. h. which will still make logs 32 feet long with a 12 inch top.

Much effort was consumed in evolving the type scheme to be used; a scheme of so-called "volume" types somewhat similar to the types already in use by the Forest Service in the region was adopted. This scheme contains three non-forest land types, two woodland types, and 33 timberland types. In this case the term "timberland" means the ability to grow timber and in addition to actually timbered types includes such types as "restocked cut-overs," "recent cut-overs" (lands cut since 1920), "deforested burns," and "non-commercial, rocky areas." The type "restocked cut overs" is not an individual type by itself, but is a sort of prefix type to be added to the type representative of the young growth on the ground. As stated before, a scheme of typing by volume is employed. In this scheme, for example, stands which contain over 60 per cent or more by volume of Douglas fir are called Douglas fir types and stands in which 50 per cent or more of the volume is western hemlock are called hemlock types. Within the Douglas fir type there are five sub-types, namely:

Douglas fir A. Stands where the majority of the volume is in trees over 40 inches d. b. h.

Douglas fir B. Stands where the majority of the volume is in trees 20 to 40 inches d. b. h. Old growth, fine grained timber that will cut a high per cent of the upper grades of lumber.

Douglas fir C. Stands where the majority of the volume is in trees 20 to 40 inches d. b. h. Young growth, coarse grained, timber that will cut only a small per cent of the upper grades of lumber.

Douglas fir D. Stands in which most of the volume is in trees 6 to 20 inches d. b. h.

Douglas fir E. Stands in which most

of the trees are 6 inches and under in diameter.

The same principle of size classes is also applied in a somewhat lesser degree to the spruce, hemlock, cedar, pine, and other types. This sort of scheme has many advantages, especially when dealing with commercial timber stands and if there are weaknesses in it they are due to the fact that the scheme is not quite flexible enough to cover the numerous species mixtures which occur and also is not quite broad enough to cover the many combinations of merchantability and unmerchantability found in types which are otherwise similar from the standpoint of species and size. In any typing it is axiomatic that the larger the number of types, the simpler is the job for the field man. In other words, he does not have to shove the many variable conditions of nature into a few arbitrary pigeon holes. On casual consideration, 38 types may seem to be a large number for a region, but even this number of types is none too large to cover the complex combinations of volumes, size classes, and species found in this region, and field men are often confronted with the problem of which of the 38 types will best cover certain conditions found on the ground.

When the Survey was started there were Forest Service volume tables for many of the species in the region but not all of them had been prepared from data gathered locally, and many of them were not made to fit the particular standards of utilization set up for the Survey. Many of these volume tables were suitable for Forest Service timber but were not particularly applicable to the higher quality, privately-owned timber found on the better sites. Therefore, one of the early jobs was the preparation of new and the modification and amendment of existing volume tables. This entailed a material amount of field work on logging operations. The measurement of felled timber in order to get a check on both old and

new volume tables has been continued as the Survey has progressed from county to county.

Field work on the inventory phase was split into two groups with somewhat different organizations and different methods. These groups are:

1. All national forest areas including all alienated land within national forest boundaries.
2. All other lands in the region outside the boundaries of the national forests.

On the private and other publicly owned lands in the region there were not only more existing data but the timber is more valuable than that in the national forest because it is, in most cases, of both better quality and more accessible. Therefore, more time and money have been spent per acre on these lands than on national forests. Although these areas are somewhat more accessible than the national forest areas, they are, nevertheless, somewhat more complex, since natural conditions have been changed by both cutting and fire, resulting in a more mixed-up type pattern than is found in the national forests.

On the national forest areas there were fewer data already available inasmuch as only about 15 per cent of the area of the national forests in the Douglas fir region had been intensively cruised to date. At the same time, the timber on the national forests is less accessible than the other timber in the region and will probably not be of as much consequence to the industry in the near future as will the private and other publicly owned timber in the region. It was obviously impossible, within the cost and time limits available, to intensively cruise all these national forest areas. In 1909-10 all national forest areas had been covered by an extensive reconnaissance which had been amended and brought up to date in 1922. It was, therefore, decided that except for those areas in the national forests

already intensively cruised, an intensive application of the extensive reconnaissance method would be used. By arrangement with the Regional Office of the Forest Service one or more men from each forest were assigned to this project, the Regional Office paying part of the cost and the Experiment Station paying the balance. During the past two years there have been an average of about fifteen men working on the twelve national forests in the region. This number is exclusive of men assigned as helpers.

These men first assembled all available material which might be of value for either volume or type purposes. There were several possible sources of data such as intensive timber surveys, cut-over records, planting reconnaissance reports, land exchange reports, and appraisals, settlement cases, trespass cases, aerial photographs, and so forth. Even with all these sources of data there were many forests with vast areas not covered by any data. Having assembled all these data, the field man then consulted local forest officers and classified the areas needing field work into three general groups, namely:

A. Areas with small stands of timber per acre including high country with no prospect of being commercially available in the near future if ever. On these areas it was planned to spend not much more than three man-days per township.

B. An intermediate class. Areas falling between Classes A and C. On these it was planned that field work would not take more than 7 to 10 man-days per township.

C. Areas with the heaviest stands per acre and so located that the timber is now commercially available or else could be economically exploited when such road and railroad developments as might be expected in the next ten or twenty years are installed. On these areas 15 or more man-days per township were planned on.

The field man planned his work so that the high country with the shorter

field season would be worked in the middle of the summer, leaving the lower areas of the forest with their longer field seasons for spring and fall work.

The reconnaissance method used on the national forests is essentially the same as has been used in many other places. It consists of the blocking out of certain areas, uniform in type condition, and then applying an average volume per acre to these type areas. The field man determines type boundaries by working along trails, using high points and by a certain amount of cross sectioning of the types. Within every type he takes a number of well scattered samples, either quarter-acre circles or one-acre strips, and, using these samples as guides, applies what he considers to be a good average stand per acre to the type. In the Cascade Range forests with their more distinct topography, the job of getting type boundaries has been easier than in the Siuslaw Forest in the Coast Range where the jumbled slopes and the luxuriant cover of second-growth timber and brush present a difficult problem to the man doing the typing. Even when on top of a ridge he usually cannot see out in any direction. This led to the Survey's trying out aerial photographs as an aid in building up the type map. Oblique, rather than vertical, pictures were used and all pictures were taken with a certain amount of overlap. Oblique pictures have certain advantages over verticals, namely, that verticals require ground control not found in this densely forested region; a greater number of vertical pictures is required thereby increasing the cost; and, most important of all, it is much easier to orient the picture when using an oblique photo since there is usually some known topographic point in the background of the picture.

The bulk of the area in the national forests of the region is quite inaccessible and, generally speaking, the going is rough not only because of the topography

but also because of the heavy brush and big timber. Many of the men have worked alone although some have had helpers. Small fly camps have been the rule except where guard and lookout stations and road and trail camps provided places to stay.

On the privately owned land and public lands other than national forests the first job was the collection of all data available. This included contacting the owners in the region who had cruises. Prior to any general request for such data two meetings were held—one in Portland under the auspices of the Forest Research Council and one in Seattle under the auspices of the Forestry Committee of the West Coast Lumbermen's Association. Certain representative lumbermen attended these meetings and the problem of getting the available cruise data was presented to them. They were guaranteed that all data furnished would be held in strict confidence and that no compilation of statistics would be presented which would in any way disclose any individual ownership. The Forestry Committee agreed to back up the project and passed a resolution endorsing the Survey and requesting the members of the Association to furnish their data. To date, practically every private owner in the region having any cruises worth getting has coöperated. The bulk of the work of copying private cruises was confined to a few towns such as Portland and Seattle. However, many cruises were on file in other towns in the region and some cruises for timber owned by absentee owners had to be gotten from points in the Middle West and East. The Oregon and California railroad land grant cruises were all available in Portland and data on state-owned timber lands were available in the state capitols. Ownership data were available both from the township plats put out by title and abstract companies and from the records in the various county assessors' offices. While at

work in the county assessors' offices the lands cut over since 1920 were plated on county maps and the county cruises were copied.

In copying cruise data, whether from private or public records, individual section assembly sheets were used so that the land office section (640 acres) represents the largest unit of area for which volume data were taken. In case the volume data showed that the section was all one type, total volumes for the section alone were copied. In case inspection of the cruise data showed that types might vary within a section, volume data were copied for each "forty." As was expected, many different ways of stating timber volumes were encountered. Not all cruisers used the same common names for the different species and different cruisers used the terms old growth, second growth, red fir, yellow fir, and others, with slightly different meanings. Considerable ingenuity was necessary to translate the data on these various cruise sheets into the type, volume and species classifications established for the Survey.

After all available data had been gathered, field work was in order. Field work on the areas outside the national forest boundaries was split into two distinct parts—one, the checking of the cruises furnished in order to properly adjust them to the standard of the Survey, and two, the mapping in place of all areas not covered by contributed data or not included in the type "cut over since 1920." Two distinct groups of men carry on these two divisions of the work. A group of three timber experts recruited by special examination from the ranks of the commercial cruisers in the region do the adjustment or check cruising and a group of five type mappers fill in all the gaps in the maps.

For administrative purposes the county is used as the organization unit with one type mapper responsible for each county. Before field work was started the prob-

lem of adequate base maps arose. Obviously, the methods used in intensive typing where several cents per acre may be spent and where adequate control lines are run followed by regular cross sectioning of the country, could not be employed here where one cent per acre might well represent a maximum cost for all phases of the project. The only course left was for the mapper to depend on the roads, streams, trails, and other base data on his map for control and to orient and locate himself by these features as shown on the maps. However, no uniform set of base maps at the scale of one inch to the mile, the scale adopted for field mapping, were available. There were various county maps put out by different agencies at different scales and of varying degrees of accuracy and dependability. The best of the county maps available were not satisfactory as regards location of hydrographic and base features. Time and money were not available to collect information for and to redraft new county maps to one uniform scale, so the following system was adopted. The man assigned to the county assembles all available maps of the county including various ownership plats. On one inch to the mile township plats he makes a new composite base map from all existing data showing everything which will serve him as control such as roads, streams, railroads, etc. On this township plat which is printed in black on white paper with the sections sub-divided into "forties" he superimposes a transparent vellum overlay township plat printed in green. On this overlay, through which can be seen the base features on the underlying plat, are recorded the types for areas covered by existing data. The blank areas on the vellum overlay are in need of field work. The vellum overlay is used because the base features on the underlying plat show through and yet the type map which is made on the vellum is not cluttered with

base data, thereby giving more room for type lines and symbols.

The preparation of these base and type plats is done in the office. When these are completed the mapper starts field work. Each mapper is furnished a car and moves about the county establishing quarters in small towns, ranch houses, with occasional periods of camping out. In his field work he maps to a fair degree of detail using minimum type areas of 40 acres for farms, timber, and reproduction over 6 inches d.b.h., and minimum areas of from 100 to 640 acres for reproduction smaller than 6 inches d.b.h. The blank areas on this map needing attention in the field consist of second growth, cut-over lands, burns, woodlots, so-called "agricultural zones" consisting of farm land interspersed with varying amounts of forest land and a certain amount of merchantable timber land for which no cruises were available. For these areas he has to get the boundaries of each silvical type, map out site or productivity zones, get the age and degree of stocking for each type under merchantable size, and for the merchantable areas determine the board and cubic foot content of the stand. In all stands under 150 years he notes the age class to the nearest 10 years and the degree of stocking. The stocking within any one type area is thrown into one of three groups, namely, good, medium, or poor. Within a type boundary he shows the type, age, and stocking conditions by symbols as follows: A certain area might be covered by Type No. 10 which is Douglas fir with the trees from 0 to 6 inches in diameter and, in this particular case, the age might be 20 years and the stand well stocked. The symbols would be recorded as follows: T 10≡. If the stand were

A 20

poorly stocked, one horizontal bar would be used; if medium, two. In this manner quite a detailed picture of an area is

recorded on a very small space on the map.

The field examiner maps from roads, trails, and vantage points on ridges, using these and other data on his basemap for control. Incidentally, the locations of corners and edges of merchantable timber on his vellum overlay also serve as control. Having determined the boundary of type areas, he must get into the type at several points to determine its age, stocking, and site class. When type conditions are badly mixed, due to the disturbance of natural conditions by cutting and fire, the work naturally goes slower and in these cases more skill and judgment is necessary. Good type mappers generally work out the smaller types first, which practice leaves the boundaries of the larger types fixed and saves time and effort. A considerable amount of training and supervision was necessary in the initial stages of the work to secure reasonable uniformity among the various field examiners.

In addition to the problem of getting over the country, much of which is not accessible by roads, the field examiners are also faced with weather problems. In the winter, even though it might not be raining, there are many days when for several hours or even all day the fog is so heavy that type mapping is impossible and in the summer there are days when the smoke is so thick that typing is materially retarded. The work must be planned so that typing is done on the bright, clear days and other phases of the work done on the days of poorer visibility.

Within the region there are several large agricultural zones with varying amounts of woodlots and patches of forest land, none of which by themselves contain any great acreage or volume of timber, but which in the aggregate constitute a material acreage of forest land and volume of timber. It is impossible to map all this detail in place at a cost

consistent with the total amount of timber present in these zones so the fieldman marks out the boundaries of the agricultural zones and strips them at three-mile intervals, taking type and volume data as he goes, thus obtaining a statistical picture of the timber acreages and volumes for the sum total of the agricultural areas in a county.

All areas cut over since 1920 are merely mapped in place from the assessor's records with no further field examination on the theory that they have not had time to reach a fixed condition as either reforesting or non-restocked cut over.

Many areas of land cut prior to 1920 create quite a problem for the field examiner. Such areas may be covered with a mixture of brush, bracken, and fireweed and upon casual inspection may appear to be non-restocked cut overs. These areas may have a fair or even good stand of reproduction under 10 years old, partially or even entirely obscured by the brush and fern cover. The boundaries of such areas are blocked out on the map and they are called "X" areas or "areas whose identity cannot be determined by casual inspection." The total acreage of the "X" areas in a county is figured up and divided by 1,280 acres which gives the miles of random line which can be run across them to get a statistical picture of their condition as to reproduction. Knowing the number of miles of line allowable in the county, the field examiner plats this mileage of line on the "X" areas on his map so as to get the best distributions he can. He then runs these lines in the field. He starts at the beginning of one of these lines, paces a chain, and stops. He is then standing in the center of four squares 13.2 feet on a side, the sides of the squares at right angles to the direction of the line he is following. He notes whether there is one well established seedling in each square. If only one of the squares has at least one seedling or sapling he puts one down

on his tally, if two of the squares are stocked he puts down two and so on up to four. He does not waste any more time on a square after he finds one tree since one tree is considered sufficient on a square 13.2 feet on a side or 0.004 of an acre. Having recorded the condition of the four squares at his first stopping point, he paces another chain and repeats the operation, and so on to the end of his strip. There are several ways of working up the strip data thus gathered to show the percentage of "X" areas, which are well, medium, poorly, or non-stocked.

Although the field examiner does not ordinarily have any material amount of merchantable timber in the county which has not been covered by data furnished the Survey, he may have certain merchantable areas where he must estimate the board foot contents by looking the area over, taking a few sample plots, and then using his judgment, tempered by the plots.

While the work of the field mappers is going on the timber experts already mentioned are checking the cruise data contributed to the Survey. At the beginning of the project it was evident that if these cruise data were to be adjusted to one common standard of utilization they would have to be checked in the field by having the Survey's cruisers take certain sample areas and cruise those samples, using the Survey's specifications in their field work. This was necessary because there is no way of sitting down in the office and examining the data given the Survey by owners of timber land and saying that this or that cruise is high, low, or correct.

It was found that specifications for any private or public cruise were not a sufficient basis with which to adjust the cruise. In a good many instances the original specifications given to the field men were not available; and even when these specifications were available and

showed the cruiser's methods of allowing for defect, size of minimum logs, etc., the personal element of the cruiser or cruisers in the execution of the work interposed marked variation in the uniformity of the cruise.

Several problems arose in connection with this sampling. How much should be done? How should the samples be distributed? What should be the area and size of the individual sample? What should be the method of estimating on the samples? When comparing volumes on areas check cruised with the volumes of the original cruise for the same areas, the Survey is looking for two things: how consistent is the original cruise, and how far apart (either high or low) is the original cruise from the Survey's standard of utilization?

The amount of checking necessary in adjusting any one set of cruise data depends on the consistency of the cruise under investigation. Let us assume that the Survey has obtained a cruise made by a standard cruising firm according to one uniform set of specifications and at one time and covering about 30,000 acres reasonably well bunched in one block. The check cruiser might pick at random six units of 160 acres each which would be a little more than 3 per cent of the area. These units should be well distributed over the area. If, after thoroughly checking each one of these units, he finds that for all of them he is from 20 per cent to 25 per cent lower than the original cruise, he would consider that the original job was consistent and was uniformly high and that the Survey should adjust the original cruise figures for this particular tract accordingly. If, on the other hand, he finds two of the units to be about the same as the original cruise, two to be 20 per cent lower, and two to be 25 per cent higher, he would feel that the original cruise was not consistent and would want to take more samples until

he was satisfied he had enough to get a good adjustment factor for this particular job of cruising.

In deciding on the size and shape of the units to be used in this check cruising, the Survey felt that there was no use in trying to compare individual "forties" because an individual "forty" is by itself a rather small unit to use for a check, also it is a unit of area for which in the average cruise there is no control on the ground. Therefore, it was decided that the unit for comparison would be a group of four "forties," either four in a line across a section, from one control line to another, or else four in the form of a quarter section which gives one section corner and two quarter corners for control.

In estimating on the sample units, quarter-acre circular sample plots are used, taking 16 such plots per "forty" giving a 10 per cent cruise. The check cruiser starts on the section line 5 chains from the edge of the "forty," paces 1.25 chains into the "forty," takes a quarter-acre plot, and continues across the "forty," taking plots every 2.5 chains. He goes through to the section line, offsets 10 chains, and comes back on the other side of each "forty" parallel to his first line.

When standing at the center of the plot the estimator can usually determine very quickly which trees are unquestionably either within or without the plot. Survey check cruisers are required in the case of all doubtful line trees to measure the distance from the center of the plot to the tree in question. This is done as follows: the tree in question is first measured for diameter, then the cruiser fastens the zero end of his 75-foot tape with a bent horseshoe nail into the bark of the tree on the side of the tree facing the center of the plot. He next unreels the tape and goes to the center of the plot. If the reading on the tape, plus one-half of the diameter of the tree is 58.9 feet or less,

the tree is taken. When the cruiser has read the distance on the tape at the center of the plot, he gives the tape a quick jerk which pulls out the horseshoe nail from the bark and then reels in the tape. All trees over 16 inches in diameter are recorded. The amount of diameter measurement done varies with the size of the timber, varying from about 10 per cent of the 20 to 30 inch trees up to measuring the diameters of all trees over 60 inches. Heights are checked by measuring a number of windfalls each day.

For each tract check-cruised the loss in volume due to defect and breakage is carefully checked by interviewing logging superintendents, foremen, check scalers, and managers of logging operations. The information thus secured from these men is also checked on the ground and then is rechecked by measuring defect on from 30 to 50 trees in a local logging operation.

When a county is completed in the field, either for mapping or checking cruising, the men doing the field work make a brief memorandum of just how the county was covered and how the data collected should be used and then their data are put in the files and they proceed to another county without doing the job of office compilation which might be expected to follow. This plan is followed in order to complete all field work as soon as possible and then concentrate the whole organization on the job of compilation and recapitulation.

However, in order to determine the proper organization of personnel and to develop technic, the job of compiling and recapitulating all data gathered on one release unit was started in October of this year with three men assigned to the work. This job consists of compiling board and cubic foot volumes, type acreages, the preparation of type maps, and the working out of growth and depletion figures for the unit. It is expected that methods, forms, organization of personnel, correction and conver-

sion factors, and other details connected with the final recapitulation of results can be developed this winter so that when the whole organization starts at this job next winter there will be a minimum of confusion and delay.

At the beginning of this paper mention was made of the discussion on methods. The compilation method, which has been described, is being used for the region but in the late winter and spring of 1931 the bulk of the Survey organization worked on the job of stripping the west 40 townships in Lewis County, Washington, which area had already been covered by the compilation method.

In this territory of nearly 1,000,000 acres, type and volume data were obtained by running continuous strips three miles apart through the area. There were nine such strips, each 54 miles long, or a total of about 486 miles of line. A continuous chain by chain record of types was kept and volumes were obtained from one quarter acre sample plots spaced at ten chain intervals on the strips. To push these strips through this country regardless of topography, lack of roads, trails, or other avenues of accessibility required the most strenuous exertion of everyone concerned and entailed a material amount of physical discomfort.

The results of the two methods were compared and for sites, volumes, and type areas the figures were in sufficient agreement to justify continuing work by the compilation method.

At the time of writing, the growth and depletion phases are still in the stage where working plans are being developed and threshed over. It appears to be a relatively simple job to show a current average annual depletion figure for the region as a whole on the basis of the records for the past ten years and also

a simple job to take the detailed inventory figures for the region and, by the use of existing yield tables as modified to fit average field conditions, work out current annual growth. This would permit a comparison of growth and depletion for the present and the immediate future (2 or 3 years). However, to split up growth and depletion into smaller geographic and ownership groups and to project them 10, 20, or 30 years into the future, is another matter creating problems which have not all been solved to date.

The Survey, long before the job is completed, is in receipt of many requests for type and volume data for areas both covered by field work and yet to be done. In many cases the parties desiring information on areas covered by field work have come to the Survey office and transcribed what information they desired from the field sheets without even waiting for the Survey's final adjustments and corrections. The author is of the opinion that a job, such as the Survey, once started, is never ended. Once the public knows and realizes the tremendous amount of detailed information about the forest lands in the region which has been gathered, many people will not be satisfied with the particular recapitulations which the Survey may make, but will be forever wanting special variations of the data on hand for particular local situations.

The results of the Survey in the Douglas fir region will be of great value and significance locally but its complete value will not be reached until it is a part of the Survey for the whole country. It will be completed several years ahead of other regions in the United States and its results should be kept up to date year by year so as to properly fit into the whole picture when all other regions are completed.

THE LAND USE PROBLEMS IN THE SOUTH¹

By CARL WILLIAMS

Member, Federal Farm Board, Washington

That the Federal Farm Board is cognizant of forest taxation problems and of the place of forestry in a program of intelligent land utilization is clearly indicated in Mr. Williams' comprehensive and constructive review of the land-use situation in the South. He discusses farming changes that affect land abandonment; sets forth the problem of declining timber production and how the forest tax problem is related to the comparative desirability of public and private ownership; the strengthening of surveys and studies to determine facts as a basis for an intelligent land policy, and the enlightenment of public sentiment. Mr. Williams recommends the set up of state planning commissions, the revision of tax systems, land classification in distressed areas and the public acquisition of marginal lands.

THE AGRICULTURAL Marketing Act under which the Federal Farm Board operates, charges the Board with the duty of developing a program of orderly and systematic marketing. As a counterpart and necessary accompaniment of that program, the Act enjoins the Board to direct its efforts also toward "orderly production," and the "prevention of surpluses." Still more specifically, the Board is instructed to concern itself with such problems as "land utilization," and the "reduction of the acreage of unprofitable marginal lands in cultivation." The framers of the Marketing Act recognized that the adjustment of production to demand is a prerequisite of effective marketing.

LAND UTILIZATION AND THE SOUTHERN PROBLEM

In attacking the pressing problems of Southern agriculture, it is obvious that the Farm Board cannot, and should not, stop with aiding farmers in marketing cotton, tobacco, rice, peanuts, pecans, fruits and vegetables, dairy and poultry products, sugar cane and other products of the region. It must also assist in developing a well-planned program of pro-

duction which shall bring about the most economical use of the vast resources of land and labor that exist in the Southern States. The agriculture of the South, like that of all other areas, is constantly undergoing adjustments, changes, and shifts. Our problem is to foresee the most desirable kinds of adjustments that should be made in the light of changing conditions, make plans to that end, and take steps to facilitate the bringing about of these adjustments.

THE MAGNITUDE OF THE PROBLEM

The magnitude of this task is attested by the fact that nearly one-half—to be exact 47 per cent—of the farm population of the United States was, in 1930, according to the census, in the twelve Southern States from Virginia to Texas. These States contributed in that year about two billion dollars, or about 23 per cent of the nation's gross cash farm income. This region comprises a total land area of slightly over a half billion acres of which about 60 per cent is in farms. We do not know the exact proportion of this acreage which is in woodland, but it is large and constitutes one of the productive timber areas of the United States.

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

THE PROBLEM IS URGENT

The urgency of the problem is illustrated by the widespread abandonment of farms in some areas, an apparently increasing amount of tax delinquency, reductions in public revenues, unemployment due to the closing down of timber industries and generally heavy burden of economic distress. These unfortunate developments could, to some extent at least, have been prevented by wise land policies put into effect at the right time. Our problem now is to prevent their continuance and intensification in the future.

In this discussion we shall be concerned with two questions, (1) what future uses of the land resources of the southern region will be soundest economically, and (2) what steps may be taken now to bring about the most desirable kinds of readjustments. We shall not be able to answer either of these questions except in a measure, but if we can make a beginning toward their solution and develop hopeful methods of attack, some progress will have been made.

PROBABLE FUTURE USES OF SOUTHERN LANDS

Excellent progress has been made by the United States Department of Agriculture in defining the outlook for land utilization in the United States. The problem has been studied from the standpoint of probable future trends in population, improvement in agricultural technique, and other significant factors, and on the assumption of no great changes in immigration laws, or in exports. The indications are that the population will continue to increase, from the present level of 125 million at a diminishing rate—now about one million a year—and become stationary by 1950 or 1960, at about 145 million. The maximum increase in population that may be expected is estimated at about 15 per cent.

At the same time it is likely that improvement will continue in the technique of agricultural production. The general conclusion from these studies is that only a slight increase in the present acreage will be needed to take care of the future needs of the population.

GREAT EXPANSION FOR FOOD PRODUCTION NOT NEEDED

There will be no material pressure on Southern lands to produce food for the rest of the country. Some further expansion may take place in the acreages devoted to early vegetables along the Atlantic and Gulf Coasts, but the total acreage involved is, of course, a very small fraction of the South's total land area. As the South's industrial population grows there will probably be some increase in the area of land used for production of food products for nearby local consumption. Between 1914 and 1927, according to the Census of Manufactures, the number of industrial employees increased about 50 per cent in the Carolinas, Georgia, Alabama, and Tennessee. In 1920, 54 per cent of the total population of the twelve Southern States lived on farms. During this period the total population increased from 27 millions to 31 millions.

COTTON ACREAGE NEED NOT BE EXPANDED

Cotton will probably continue for some time to be the dominant farm enterprise of the South. Any needed increase in cotton production for the future, however, must result from an increase in population, in per capita consumption of cotton, or in exports. Assuming that the consumption of cotton in this country continues at the comparatively stable rate of the past 30 years of 25 to 30 pounds per capita, and assuming no great change in exports nor in immigration policies, an average annual production of only a lit-

the higher than that of recent years—and less than that of the past year—will take care of the future growth of population. Such an increase can be brought about by an average increase in yields per acre or less than one-half of one per cent per annum for the next twenty years, without any net increase in the acreage of land devoted to cotton.

ACRE YIELDS OF COTTON SHOULD BE INCREASED

It is highly desirable that acre yields of cotton be increased. A large proportion of farmers in the Belt are producing cotton at such low acre yields, and with such a low total output per man, that, after allowing for cash costs such as fertilizer and ginning, and for returns to labor at a subsistence level, nothing is left for land rent. For example, data as to acre yields in 1930 on one thousand farms in one of the leading Southeastern cotton states adjusted to the ten-year average acre-yield for the state, indicate that about one-third of the farmers had average yields of less than one-fourth bale per acre, and three-fourths of the farmers had yields of less than one-half bale per acre.

COTTON PRODUCTION CENTER MOVES WESTWARD

One of the most significant trends in the use of land for cotton has been the westward trend of the center of production, marked expansion having occurred particularly in the Great Plains area. In Oklahoma and Texas there has been an increase of more than 6 million acres of cotton during the past ten years. In those two states the cotton acreage increased about 43 per cent from 1920 to 1930. In that period, Texas and Oklahoma have produced 40 per cent of the total cotton crop, as compared with 36 per cent from 1910 to 1920, and 31 per cent from 1900 to 1910.

CONTRACTION OF COTTON ACREAGE IN OLD SOUTH

In contrast to the westward expansion, severe contraction in acreage took place in several of the Southeastern States. In Georgia, the cotton acreage in 1930 was 17 per cent less than in 1920. In South Carolina, Georgia and Alabama, there has been partial recovery from the extreme contraction which took place in 1920 and 1921, but in those states the maximum acreages reached before the boll weevil have not been equalled since.

In the old plantation piedmont area of the Carolinas, Georgia and Alabama, which is in the heart of the territory which has suffered most from the devastation of the boll weevil, a decline of 42 per cent took place in the crop land harvested in 59 counties from 1919 to 1929.

ECONOMIC ADVANTAGES OF WESTERN COTTON BELT

The greater efficiency in production in the Western Cotton Belt is evidenced by the fact that in 1929, in Texas and Oklahoma 66 acres of crops per farmer were reported, as compared with 29 acres in South Carolina, Georgia and Alabama. In both areas about the same proportion of the crop acreage was planted to cotton, so that in the Western area one man handled more cotton, and other crops as well, than did one man in the Southeast.

According to studies made by the Mississippi Delta Experiment Station in 1929 and 1930, if one had to hire all the man labor and mule labor, cultivation costs would be reduced about 40 per cent by changing from one-mule to four-mule equipment, and 60 per cent by changing to four-row tractor equipment. If a mechanical cotton picker is perfected, labor requirements in cotton production will be reduced materially, and the shift in acreage to the western part of the belt will be stimulated further.

ECONOMIC USE OF LAND FOR TIMBER

Although much of the land in the southeast is now submarginal for cotton, fortunately much of it has possibilities of yielding economic returns from timber production. Studies conducted by the Southern Forest Experiment Station indicate tentatively that "stabilized net incomes are being obtained from properly stocked pine forests lands of from \$1.00 to \$6.00 per acre. Whole counties are showing stabilized average net land incomes of \$1.00 and \$1.50 (before taxes) from second-growth forest lands in their present subnormal forest density. Fairly well stocked but yet unmerchantable young forests are earning 4 per cent to 6 per cent on valuations of \$10 to \$15 per acre, and similar satisfactory interest rates compounded on bare land that must be planted at values of \$2 to \$5 per acre may be obtained."

LOCAL WOOD-USING INDUSTRIES

Local timber and wood-using industries have been, in the past, an important source of supplemental income to large numbers of farmers in the South. In the ten Southern States which contain most of the woodland of the region, farmers received, in 1930, \$77,000,000 from the sale of forest products, which was 6 per cent of the total gross cash income to agriculture. New industries, such as wood-pulping operations, will make possible the more profitable handling of local timber tracts. According to trade reports, the capacity of plants in nine Southern States for pulp production increased from 380 thousand tons in 1921 to one million tons in 1929. It is within the bounds of probability that further substantial development of the pulping industry in the South may take place. Of interest in this connection is the recent announcement that an experimental plant will be established at Savannah for the

purpose of manufacture on semi-commercial plant scale of newsprint from Southern pines. The Georgia State Board of Forestry has appropriated \$40,000 for this project, and the Chemical Foundation, Incorporated, of New York has contributed \$50,000 for the purchase of equipment.

PROGRAM OF PUBLIC ACTION SHOULD BE DEVELOPED

It seems clear from the problem before us that the public interest would be best served by eliminating from cotton production much of the low-yielding cotton land of the Southeast in areas not generally adapted to the use of modern machinery. Individuals acting on their own initiative and responsibility may not be expected to make the necessary shifts promptly and without a considerable amount of economic waste. Public policies and action, adequate to cope with the problem therefore, should be developed.

ABANDONED FARMS SHOULD NOT BE RE-OCCUPIED

There are more farms of the small, self-sufficing type in the South than in any other region of the United States. Many of these farmers, or members of their families, are engaged in full-time or part-time employment in nearby industries. Others may own their farms free of indebtedness, and remain contented with a relatively low standard of living. The Farm Board has full faith in the small farm as a source of living and in small farming as a mode of life and we believe that there will always be an important place for that type of farming in the South. Obviously, however, too many farmers are attempting to make a living on relatively inaccessible and unproductive land. Such lands should gradually be "liquidated." Doubtless many of these

farmers would be glad to sell their holdings at nominal prices. Even if we succeed only in permanently keeping the already abandoned lands from becoming re-occupied and prevent farmers from beginning anew a hopeless struggle to make a living on them, much good will have been accomplished.

TAX DELINQUENCY INCREASING IN SOUTHERN STATES

The need for more vigorous public attention to the problem is emphasized by the increasingly large amount of tax-delinquent land in Southern States and counties. Data at hand from Florida serve to illustrate the situation. The Florida Forest Service found that in 1928 about 6 million acres which is about 17 per cent of the total taxable land area in Florida, had reverted to the state because of tax delinquency. In 1929, in nine Florida Counties, 870,000 acres, or 21 per cent of the total taxable land area of these counties, was tax delinquent. In a subsequent survey of over one million acres of land, tax delinquency had increased from 21 per cent in 1929 to 49 per cent in 1930. These figures are not necessarily typical of other Southern States, and the situation in Florida will not necessarily continue to be so critical; but there is undoubtedly an increasing burden of maladjustment growing out of the practice of most of the States of trying to collect revenues from lands whose income has been severely reduced.

DECLINE IN TIMBER OPERATIONS HAS RE- DUCED ABILITY TO PAY TAXES

Present systems of taxation are in many instances preventing the most economical uses of large areas of land. This condition applies particularly to cut-over and young second-growth forest lands, which, in 1920 amounted to 51 per cent of the total forest area of the South. The

acreage of such lands has undoubtedly increased substantially during the past decade. As long as timber was being cut in volume, taxes did not constitute such a large proportion of income as to be burdensome. But with the decline of timber operations, an acute need has arisen for radical adjustments in methods of taxation. According to data collected by the Southern Forest Experiment Station and the Florida Forest Service "the portion of the net forest income taken by taxes in four Florida counties (in 1929) ranged from 15 per cent to 81 per cent, while in one county in Georgia and one county in Alabama the corresponding figures were 17 per cent and 18 per cent respectively." Such a burden of taxation is, of course, discouraging to private ownership of forest lands.

ONLY FOUR STATES HAVE FOREST TAX LAWS

Only four of the Southern States, Virginia, Alabama, Mississippi, and Louisiana, have forest tax laws of any kind. The Virginia law, which was passed in 1930, provides for a deferred tax on forest tracts. Up to July 1 of the present year, however, no lands in the state came under the operation of this law. The Alabama, Mississippi and Louisiana laws provide for exemption of forest trees from taxation, and a yield tax on timber when cut. On July 1, in Louisiana, 2.1 per cent of privately owned forest land had been taxed under the special law, while in Alabama only two-tenths of one per cent, and in Mississippi none of the land was so taxed.

The forest tax problem is related to the question of the comparative desirability of public and private ownership. Where danger exists and cannot be prevented of privately-owned lands being sold for use in uneconomic agricultural production, reversion of lands into public ownership may be desirable. On the

other hand, where utilization for forestry or other purposes is economically practicable for private owners, it is desirable that all legitimate means be exhausted to encourage such ownership and use.

TAX SYSTEMS SHOULD BE REVISED

Considerable revision needs to be made in state tax systems in order to encourage desirable private ownership of forest lands. The land tax problem is a part of the larger problem of reconstructing systems of public revenue which will give a more equitable distribution of the tax burden than now exists in most of the states. The base of taxation needs to be more evenly distributed between property and income or other measures of ability to pay taxes. There should be closer coordination and better allocation of taxes as between federal, state and county governments. By no means the least important phase of the tax problem is a reduction of wasteful expenditures and the adoption of businesslike methods of financial administration.

ACQUISITION OF LAND BY PURCHASE

One of the ways of preventing future agricultural expansion in poorly adapted areas is bringing such lands under public control. In view of the rather large proportion of tax-delinquent land in Southern States and counties, and in view of the possibilities much of this land has of paying an economic return, it seems that a basis is afforded for a substantial increase in public acquisition by purchase of certain kinds of land or by retaining lands now held as tax delinquent.

Under the Weeks law, as amended by the Clarke-McNary law, the United States government has acquired about 2.4 million acres of land to date in eleven Southern States at an average cost of \$4.52 per acre. There has been acquired in 1931 about 286,000 acres at an aver-

age cost of \$3.10 per acre. Recognizing the benefits from this program, but its inadequacy in view of the magnitude of the problem, the Farm Board in line with the previous recommendations of the Secretary of Agriculture, recommended in its second annual report provision for public acquisition of considerable amounts of land of the following types, not only in the South, but also in other forest regions:

"1. Tax-delinquent forest, cut-over, brush, and farm lands capable of being converted into forest or recreation lands, public grazing lands, watersheds, water-supply basins, etc.

"2. Carefully selected tracts of distressed land not yet tax delinquent, with a view to hastening its conversion into forest or other uses for which it seems destined in the near future.

"3. Tracts of land valuable for specific public purposes such as parks, watersheds, etc."

The Board recommends purchase of only such lands as can be acquired at relatively low cost and suggests that a beginning be made in this direction, with a view to enlarging the scope of operations in the light of future experience.

LAND CLASSIFICATION IN DISTRESSED AREAS

It is easy to locate, in a general way, the most distressed land areas of the South. But the development of a long-term plan for each area, zoning, and laying out tracts for acquisition requires a careful survey of the present and potential uses of the land, its availability and costs of management under public control. Quoting again from the second annual report of the Farm Board, "the Board thinks that it would be unwise at this time to undertake a large-scale and comprehensive program of classification of land according to probable future uses . . . the Board suggests that

surveys be made each year in a number of distressed land areas where a program of public acquisition seems to be indicated by such information as is already available. . . . These surveys should have as their objective the developing of a definite plan of land use for each area." It appears worthwhile to begin a program of classification in some of the acutely distressed areas of the Southeastern States, but such classification surveys could fit in with programs for purchase.

STATE AND FEDERAL LAND PLANNING COMMISSIONS

The problem of developing a wise land policy in each of the states has become of such wide public concern as to call for the setting up in each state of a land-use planning commission, whose function would be to work out a well-coördinated and economically sound program for the use of land resources. Such a commission, in many instances, might be constructed from existing state commissions now dealing with such matters as forestry, geological and land surveys, watersheds, public parks, game preserves, and land settlement. Such an agency should be closely tied-in with forestry, tax, and other commissions dealing directly with land utilization. Some of the states now have informal committees working on land problems but it is desirable to have full-time commissions equipped with adequate funds and personnel and clothed with appropriate authority. An important function of such a commission would be the coördination of state and county programs of land utilization.

In order to develop and carry out a national program, coördinated with state and county programs, the Farm Board has recommended in the annual report "that a special land planning commission should be set up, its personnel consisting of representatives of the United States

Department of Agriculture, the United States Department of the Interior, the Federal Farm Board and possibly other agencies which are especially concerned with problems in land utilization."

RESEARCH AND EDUCATION

The basis of an intelligent land policy is adequate knowledge of the problems involved and of methods of solving them.

Considerable headway has been made in recent years in research, pointing the way to the most economic use of various types of land. Further study is needed, however, by state and federal agencies to determine those adjustments in land utilization between various regions which shall in the long run prove best for all concerned. The Division of Land Economics of the Department of Agriculture has done pioneer work in this field and has made contributions of great significance. Noteworthy also is the diversified program of research and educational work conducted by the Forest Service of the Department of Agriculture. The surveys and studies that have been and are being made of forest management, forest fire problems, grazing, erosion, the financial aspects of forestry, wood utilization, and other problems indicate a growing body of useful knowledge, which is an invaluable aid to economic planning. These and other related lines of work need to be further amplified and strengthened in order to bring about an enlightened public sentiment toward land problems.

A PROGRAM

In this brief discussion it has not been possible to even touch upon all the ramifications of the problems of land utilization in the South. The need for a definite policy and program is clear; the facts point to the desirability of early action by federal, state, and local agencies. The Farm Board believes that a program

containing the following elements should be carried forward vigorously at the present time.

1. The establishment of federal and state land planning commissions, with scope and power to act without further delay.

2. Revision of tax systems so as to encourage desirable private ownership of lands suitable for production of timber.

3. Beginnings of land classification in distressed areas.

4. Public acquisition, after careful investigation, of idle, cut-over, and marginal lands, to prevent undesirable agricultural expansion.

5. Further development of research and educational projects relating to problems of land utilization.

All agencies concerned should unite in carrying out this program in such a way as to bring the greatest social and economic benefits to the South, as well as to other sections of the Nation.

FINANCIAL ASPECTS OF GROWING PINE IN THE SOUTH¹

By E. A. ZIEGLER² AND W. E. BOND³

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In this article an easily followed financial analysis demonstrates the costs of forestry, the actual income per acre and the adjustment of income to increment to take care of depletion. It shows under what conditions forestry is a profitable venture for private capital. Although the figures concern only a few sample naval stores and lumber counties in restricted regions, the principles upon which they are based are applicable over a much wider territory. The authors emphasize for both types of forest that a reasonable density of stocking is paramount to financial success.

ONE OF THE outstanding problems of the United States today is the use of its land area so as to obtain continuously the farm, forest and range products consistent with our national economic welfare. For the present relative over-production of agricultural products we hear advocated almost daily the reduction of crop area, and not infrequently the additional opinion that the submarginal farm lands should be put in timber. New York has only this fall approved by popular vote (constitutional amendment) a mandatory 11-year appropriation schedule of 19 million dollars for the state purchase and reforestation of abandoned farm lands. On the other hand, cut-over forest lands in some sections are being surrendered in such large areas to the states and counties, rather than pay the taxes on them, that the apt phrase the "New Public Domain" has been coined to describe them. There are thus seen opposite movements and opinions concerning the use of non-agricultural lands for growing forest crops.

INTEREST OF LUMBER MANUFACTURERS

In a "Statement of Forestry Policy" the National Lumber Manufacturers Associa-

tion stated in 1929, " * * * We must look for an increasing proportion of our timber supplies to man-grown forests. There is sound reason that the lumber industry should lead rather than follow in the development of commercial forestry.

" * * * the possibilities of profit in commercial timber growing are expanding.

"Lumber manufacturers should stand ready to extend the practice of commercial forestry as far and as fast as dependably ascertained economic facts and prospects will warrant. * * * To aid in such studies the Association offers the facilities of its forestry and other departments."

THE SOUTHERN PINE SITUATION

The pine region under discussion embraces the commercial range of the four southern pines, *Pinus echinata* (shortleaf), *P. taeda* (loblolly), *P. palustris* (longleaf), and *P. caribaea* (slash), and extends from Virginia to Texas—*P. echinata* and *P. taeda* extending somewhat further north and east.

The southern pine stand from Virginia to Texas as of January 1, 1931 has been estimated by the Forest Service approximately as follows:

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

²Director, Pennsylvania Forest Research Institute, Mont Alto, Pa.; formerly (1929-1931) Senior Forest Economist, Southern Forest Experiment Station.

³Forest Economist, Southern Forest Experiment Station, New Orleans, La.

Saw timber (8 inches and over d.b.h.)	Area ¹ million acres	Stand billion board feet
Old-growth longleaf and slash pines	2.9	13.9
Second-growth " " " "	7.7	12.9
Total " " " "	10.6	26.8
Old-growth shortleaf and loblolly	3.3	19.0
Second-growth " " " "	22.7	70.3
Total " " " "	26.0	89.3
Grand total pine saw timber	36.6	116.1

¹This area includes "longleaf-slash" type and "shortleaf-loblolly-hardwood" types. The "oak-pine" type is not included in pine land area, though the pine is accounted for in the stand given.

The above estimate is a summation of state estimates, obtained from all authoritative sources and approved by the state foresters and others familiar with timber conditions.

Besides the saw-timber down to an 8-inch tree diameter, there is estimated to be an area of 33 million acres of longleaf and slash, and 48 million acres of shortleaf and loblolly restocking to some degree with trees from 8 inches down to seedlings. 12 million acres are estimated as not commercially restocking (above 10 per cent).

The annual growth is placed at 4 billion board feet of saw timber 8 inches and up. The annual drain, from lumber manufacture as well as other products cut from pine over 8 inches in diameter, is estimated at 17.6 billion board feet by the Forest Service. There is also a fire, insect and disease loss placed at 0.5 billion board feet, making a total depletion of 18.1 billion board feet of saw timber. Deducting the growth of 4 billion, there is then a net depletion of 14.1 billion board feet annually, based on the last 5 years. This depletion will fall with the falling cut and the increasing area of young growth. At what point growth and drain will balance, before management succeeds in making an increasing cut possible, is

a matter of opinion at the moment and cannot be known until the recently initiated Forest Survey is completed. However, the financial aspects of this discussion loom large when it is noted⁴ that 140 large mills disposed of over 44 per cent of their cut within the South. Remembering that small mills sell even a larger part of their cut locally, it appears that the South may at an early year use practically its entire pine cut, when local stumpage will *add* freight costs based on competitive lumber coming in, instead of *deducting* freight costs to distant competitive markets.

FINANCIAL ASPECTS OF GROWING SOUTHERN PINE

Recognizing the need for facts, the Forest Service in 1929 initiated at the Southern Station the study known as "Financial Aspects of Growing Southern Pine."

Private forest investment for sustained yield will not generally begin with bare land and accept the long wait after reforestation. It will more often begin with young growth with some immediate income or an expectation of income at an early date. Measures for increasing the stand with incidental reforestation will be adopted as their financial feasibility be-

⁴See p. 62 of Economic Conditions in Southern Pine Industry, Southern Pine Association, New Orleans, La., 1931.

comes clearly apparent from results attained by the pioneers. The rapidly vanishing virgin timber has little in common with the forest of tomorrow except to set a standard of timber quality to be approached as near as may be in timber grown by men in a fraction of the time required by nature for the virgin timber. The study is therefore primarily concerned with second-growth pine.

The general plan of this study includes in its first phase twelve county background surveys. These are representative of large second-growth pine types and various forms of utilization, such as lumber, naval stores, pulp wood, and others. They were also chosen for the relative prominence of farm woodland holdings embraced in them. In only four of the twelve counties do large lumber companies' holdings dominate any large part of the forest area. The study is now completing this county survey phase as a background.

The second phase of the study is to include a series of "case studies" of large and small single forest properties, representative of various timber types and typical of different forms of utilization.

Special reviews will be made also of the movement and trends of market prices on the income side, and relative costs of manufacture due to different methods and organization, and costs of growing (as protection and particularly taxes) on the expense side.

THE COUNTY SURVEY

The county was taken as a unit in order to show average conditions as they exist over a large area and not particular conditions on limited areas. County-wide surveys disclose good, poor and average forest conditions. Large forest properties include these same possibilities and county average forest income may prove a better measure than incomes recorded on small exceptionally well-stocked tracts of limited occurrence. However, county aver-

ages may be too general to apply to specific tracts.

In order to provide a measure of income to owners of forest tracts of various qualities, the income was determined for the better and poorer tracts as well as for the average of the county. In naval stores counties stands were grouped by number of units per crop and in lumber counties by densities of stands. The incomes of the better stands, which are averages of considerable area, are not beyond the possibilities of the average owner. In order to show possibilities under intensive forest management, the high incomes of limited areas of exceptionally well-stocked stands were measured. *It is recognized, however, that no computed income will be an exact yardstick by which to judge a given property.*

The survey consists of two parts: First, a financial analysis to determine the actual income per acre from the forest; and second, a stand depletion study to adjust the actual income to increment. The surveys have been divided into two groups: First, naval stores pine type, including counties producing principally naval stores; and second, lumber products pine type, including counties producing chiefly lumber, ties and other wood products. In order to clarify methods used, one "naval stores" and one "lumber" county will be covered in some detail. Results from other counties will be presented in tables.

THE NAVAL STORES PINE TYPE

APPLING COUNTY, GEORGIA, SURVEY

The first naval stores pine type county surveyed was Appling County, Georgia. This county lies in the southeastern part of the state on the north edge of the optimum second-growth longleaf-slash pine flatland belt, including southeast Georgia and northeast Florida. The forest is mainly second growth, averaging 31 years

old, with scattered remnants of virgin timber of greater age, too small or defective for removal in the virgin timber logging. Slash pine represents over two thirds of the stand. The average site is 60 feet for slash pine and 55 feet for longleaf at 50 years. There are 136,000 acres of merchantable and 32,000 acres of young unmerchantable pine in the country.

The principal industry is the production of naval stores. The stands are very intensively worked. The 168,000 acres of pine support 33 stills and in 1929 produced 10,437 "units"⁵ of naval stores.

FINANCIAL ANALYSIS

The financial analysis of the forest industries begins with the selling prices of products f.o.b. county points (or at seaboard for naval stores) and a deduction of all costs of production including 8 per cent interest on the investment. The remainder was designated the "timber realization value," which includes stumpage and margin for profit and risk.

Thus an average naval stores "crop" (10,000 cups) producing 35 units of naval stores had in 1929 the following summarized costs and income, based on an average 10-crop operation (complete detail statement appears in Table 1):

	Per Crop	Per Unit
Total producing cost at the still	\$1,743.25	\$49.81
Marketing cost, including freight	186.20	5.32
<hr/>		
Total producing cost at seaboard	\$1,929.45	\$55.13
Sale value—at seaboard	2,369.50	67.70
<hr/>		
Realization value for timber and profit	\$440.05	\$12.57
Actual payment for timber lease	420.00	12.00

The actual payment for a 3-year timber lease paid in advance was \$375 per crop, which, with interest at 8 per cent for the mean of the period or 1.5 years, would require an outlay of \$420. The realiza-

tion value of the timber at \$440 is thus seen to have been \$20 per crop or 0.2 cents per cup above the base payment, which is not a fair margin for profit and risk. This relatively high lease payment can be explained by a lag in market value of timber leases, since the 1929 still sale value was \$62.38 per unit as against an average for 1922 to 1930 inclusive of \$73.73. If the 1929 sales had had the 1928 prices (\$66.54 at the still) there would have been a margin of almost 10 per cent of the cost of production (excluding lease) at the still for profit and risk margin above 8 per cent on the investment. The intensive competition in production in this county can also be seen in the fact that over 20 per cent of the cups were hung on trees from 5 to 7 inches d.b.h.

The total gross still value of the naval stores in the county was \$651,060, and the timber lease value of 348 crops (produced in the country in 1929) at \$420 per crop was \$146,160.

The few lumber operators in the county were not working on such a close margin as the naval stores operators. For the more strictly second growth, the logging costs of 4 portable mills were \$7.00 per thousand board feet from stump to mill; milling costs were \$4.69 including labor, interest, depreciation, repairs and overhead; and hauling to concentration yard or shipping point was \$2.70. Planing and loading costs without kiln drying were about \$2.24, making a total cost of \$16.63 per thousand board feet from stump to car. The average value was \$23.25 f.o.b. car, leaving a timber realization value of \$6.62. Allowing 15 per cent on the manufacturing cost for profit and risk would show an appraised timber value of \$4.13. However, the average sale value of lumber cut (both virgin and second growth) by all classes of mills in the county was

⁵One "unit" is one 50-gallon barrel of spirits and the associate product of 3 1/3 barrels of rosin of 500 pounds gross each.

TABLE 1

SUMMARY OF NAVAL STORES PRODUCTION COSTS AND INCOME FOR A 30, 35, AND 40-UNIT CROP FOR A 10-CROP OPERATION IN APpling COUNTY, GEORGIA

(Costs per Crop)

Item	30-Unit Crop	35-Unit Crop	40-Unit Crop
	Dollars	Dollars	Dollars
Costs—dependent of yield			
Hanging cups and tins at \$11 per M, and raising cups at \$7.50 per M, prorated over 4 years	46.25	46.25	46.25
Supervision—salaries and maintenance car and horse	200.00	200.00	200.00
Depreciation, all property	220.10	220.10	220.10
Maintenance, buildings, still and tools	75.00	75.00	75.00
Taxes and insurance	20.00	20.00	20.00
Fire Protection, raking ¹	40.00	40.00	40.00
Miscellaneous expense, recruiting, telephone, etc.	10.00	10.00	10.00
Chipping at \$1.25 per M cups	400.00	400.00	400.00
Interest at 8% on average investment	81.60	81.60	81.60
Costs—dependent on yield			
Dipping at \$1.00 per 50 gal. bbl. ²	150.00	175.00	200.00
Scraping at \$2.00 per 300-lb. bbl.	42.00	49.00	56.00
Hauling at 50c per bbl. gum (excluding depreciation)	85.50	99.75	114.00
Still operating at \$9.33 per unit (includes barrels, labor, materials, no depreciation)	279.90	326.55	373.20
Total cost at still (excluding timber lease payment and accrued interest)	1,650.35	1,743.25	1,836.15
Selling cost—rosin \$1.10 per bbl. Spirits \$1.65 per bbl.	159.60	186.20	212.80
Total cost (seaboard) exclusive of timber lease	1,809.95	1,929.45	2,048.95
Sale value ³ 1929 at \$67.70 per unit (seaboard)	2,031.00	2,369.50	2,708.00
Realization value ⁴ for timber and profit	221.05	440.05	659.05
Rental paid for timber, average over county with carrying charge ⁵	336.00	420.00	504.00
Average profit (+) or loss (—) ⁶	(—) 114.95	(+) 20.05	(+) 155.05
Total cost at still (excluding average rental and rental interest)	55.01	49.81	45.90

Selling cost	5.32	5.32	5.32
Total cost (seaboard) excluding timber lease	60.33	55.13	51.22
Timber lease, 1929, paid in advance with average interest charges	11.20	12.00	12.60
Total cost (seaboard)	71.53	67.13	63.82
Sale value (seaboard), 1929	67.70	67.70	67.70
Profit (+) or loss (—) per unit, 1929	(—) 3.73	(+) .57	(+) 3.83

¹ Fire protection of operated timber included as a production cost since it is required by the lease.

² 5.7 50-gallon barrels dip and scrape taken for each 1 barrel spirits and 3 1/3 barrels of rosin. 5.0 barrels of dip and .7 barrels of scrape is the approximate proportion per unit of product in Appling County. These figures may be 5 per cent high for clean gum and scrape.

³ 1929-30 net f. o. b. shipping point as shown in Gamble's Naval Stores Yearbook 1931-32, p. 65, with selling costs for Appling County added.

⁴ "Realization value" is the balance left for timber lease, interest on timber lease and profit after all cost including all other interest have been deducted. It is the total net return on the timber worked by its owner. It is the maximum an operator could pay on timber lease and timber lease interest (when paid in advance) and still break even if leasing timber.

⁵ Since the realization value (income plus profit) of the timber is being sought, timber leases paid in advance and the resulting interest charges are subtracted in this Table from realization values in getting the profit or loss. Annual lease payments are assumed to be \$300, \$375, and \$450 and for 30, 35 and 40 unit crops, respectively. Leases average 3 years. So the average lease investments for 1.5 years in advance, on which must be figured carrying charges, amount to \$450.00, \$562.50, and \$675.00 per crop, respectively. The interest charges at 8 per cent are \$36.00, \$45.00, and \$54.00, therefore the lease payments in advance with carrying charge are the equivalent of \$336.00, \$420.00 and \$504.00 per crop if paid at mid-year. This would give costs of 3.36, 4.20 and 5.04 cents per cup for 30, 35 and 40 unit leased timber.

⁶ Profit or loss applies to operator leasing timber 3 years in advance with carrying charges as noted in note 5.

Note: Taken from an office report "A Financial Study of Growing Slash and Longleaf Pine in Appling County, Georgia," by E. A. Ziegler, A. R. Spillers, Southern Forest Experiment Station, New Orleans, La.

\$26 per thousand broad feet, and the average price paid for stumpage was \$4.00. The lumber output of the county was 4,040,000 feet in 1929 with a gross product value f.o.b. shipping point of \$105,040 and a stumpage or forest income value of \$16,160.

Similarly the gross production value and stumpage value was obtained and checked for staves, hewed ties, poles and piling, logs shipped, and fuelwood shipped. No entry is made for fuelwood used locally by the land owner. The gross forest products income for the county by the complete canvass was \$917,447 and the stumpage or forest income was \$228,840. Making small deductions for hardwood logs and hewed ties coming from the small river bottom hardwood area, the pine forest land of the county brought in \$4.92 per acre, gross forest product income, and \$1.12 per acre as forest income (stumpage and timber lease), of which naval stores represented \$0.88.

STAND DEPLETION

The question then presented itself of determining whether this forest income should have a deduction for stand depletion or a sum added for stand accretion. This involved sampling the forest. Accordingly 22 random tracts were sampled with 30.7 acres of strip survey to obtain a sample acre for the merchantable forest (not including tracts entirely in the reproduction stage). The trees were tallied in 2 inch diameter classes, and classified as round, worked out, and working, with the number of cups hung and the number of years working trees could continue at the same rate. Three to ten trees on each plot were measured for diameter, total height, age and rings in the last radial inch. Mortality was determined for the last 2 years by tallying the dead trees still holding their bark.

By reconstructing the stand table corrected for mortality, it was possible to

approximate the volume increment (corrected for loss in turpentine butts). The present cut of lumber and other timber was found to about balance the net current annual increment, which was placed at 39 board feet per acre per year merchantable after deduction of 2.5 per cent of the stand for mortality and 30 per cent of the increment for butt cull. The mean annual increment was 84 and the current annual increment was 121 board feet per acre before deduction for mortality and cull.

But the number of round trees coming on is insufficient to maintain the present number of cups for the next 12 years. The data indicated a fall in cups to 51 per cent of the present number at 12 years and then a gradual rise to 98 per cent in 24 years. Therefore the naval stores income was reduced 25 per cent to cover average depletion in the next 24 years, while the wood products were credited as being stabilized in volume at present.

FOREST INCOME AND PROPERTY TAX

The pine forest income therefore was placed at \$1.12 less \$0.22 for naval stores depletion or \$0.90 per acre. From this must be deducted the average forest property tax of 32 mills on an assessed valuation averaging \$5.00 per acre or a tax of \$0.16 per acre. Taxes here represent about 18 per cent of the forest income and cannot be said to be unduly burdensome. Protection costs (generally raking around trees) are carried as a naval stores operation cost, and by substituting state cooperative protection no additional costs would be incurred. The raking charge at \$40 per crop represents \$0.12 per acre (30 cups) for working forest. This 1929 net forest income of \$0.90 minus \$0.16 tax or \$0.74 per acre made the average pine forest a fair investment at over \$9.00 per acre figuring money at 8 per cent, and at over \$12.00 per acre

figuring a forest investment at 6 per cent net after taxes. Average forest lands could be bought within these limits in 1929, and a number of naval stores operators were adding to their forest area owned, rather than continue under the vicissitudes of leasing.

FULL TIMBER STANDS

While these are average results for all pine land in Appling County with 21 turpentine cups per acre and a stand density of only 23 per cent of "normal"⁶ as shown by Southern Pine Yield Tables, maximum stands were found in the county running 109 to 154 cups per acre at 20 to 25 years. If an intensively managed forest could support 100 cups per acre, the 1929 prices would permit a forest income of \$4.20 per acre from naval stores alone. Such a heavy stand would show larger economy in working and greater timber lease values than those for scattered timber stands.

In this respect sustained yield forestry is no different from agriculture. The man with full stands of cotton and corn always fares better than the man with fractional crop stands.

And full stands are within reach in Appling County if general community interest in fire protection is secured. For even planting 200 trees per acre 14 x 14 feet should not cost over \$1.80 with trees at \$5.00 per thousand and labor at \$2.00 per day. Bare land can be had for \$2.00 per acre or less. Such a forest property could be managed on a 48-year rotation. Assuming 150 slash pine trees to reach a 9.8 inch cupping size at 30 years,⁷ 50 trees would be cupped on 2 sides each simultaneously from the 30th to 36th year and then removed, while the 100 final

stand trees would be cupped on one side only, beginning at 30 years also. This would give 200 cups per acre on the 30- to 36-year timber averaging 11 inches in diameter. This is 35-unit timber or better, worth in 1929 \$0.042 per cup annual lease. The final stand trees could be worked two more faces in succession 6 years each. During this period they would average 13 inches in diameter and produce 50 units per crop, worth in 1929 \$0.10 per cup annual lease. Crediting the 50 trees thinned at 36 years with 3,000 feet of stumpage at \$4.00 per thousand, and the 100, 48-year old trees removed finally with 10,000 feet worth \$6.00 per thousand, the 48-year regulated forest would produce a lease and stumpage income at 1929 prices of \$5.05 per acre per year.

Although the 1929 naval stores prices were substantially below the 1922 to 1930 average, the 1931 prices are only from 50 to 60 per cent of the 1929 prices. But as prices will undoubtedly increase again, the naval stores pine land owner with the fully stocked land will be at the top of the net income group.

NAVAL STORES COUNTY SURVEYS IN FLORIDA

In addition to Appling County in Georgia, Bradford, Hamilton, Washington, and Osceola Counties in Florida were surveyed in coöperation with the Florida State Forester. These are also naval stores counties. The number of sample areas in each county studied in detail were increased and mathematically located. Access was also had to extensive detailed strip records taken by the Forest Service acquisition staff in Bradford and on lands adjoining in Hamilton. Impor-

⁶Normal density for maximum turpentine production has not yet been determined. It will be less than for timber.

⁷Based on the diameter growth for the county.

tant checks were made by the cups known to be hung in each county.

Bradford and Hamilton Counties occur in northeastern Florida in the optimum second-growth longleaf-slash pine flatland belt. They are very similar as to stands of timber, both having essentially young stands (average 20 to 30 years) of longleaf and slash pine with generally open stocking (average 14 to 16 per cent of normal). Sites average about 68 feet at 50 years for longleaf and 75 feet for slash in Hamilton County, and slightly better for Bradford County. In both counties some well stocked stands were located with increments of 500 board feet or more.

Washington County lies in the western panhandle of Florida. Its pine timber is chiefly longleaf, occurring on rolling uplands. Only a mere sprinkling of slash occurs. The average age of dominant trees is about 50 years and average density is 22 per cent of normal. The average site for longleaf is 55 feet at age of 50 years. About 100,000 acres of sand hill country, which is not generally restocking to pine, is not within the possibility of private ownership and has not been considered in calculations.

Osceola County, situated in the southern half of the State, is generally low and flat. The virgin stand of longleaf pine, with an average density of 26 per cent of normal, has been removed from 75 per cent of the pine area and restocking is poor, 8 to 10 per cent of normal. The average site for longleaf pine is about 47 feet at age of 50 years and ranges from 40 to 60.

FINANCIAL ANALYSIS AND DEPLETION

The financial analysis and depletion, as given in Table 2, indicate that Bradford and Hamilton Counties, with sparse young stands of longleaf and slash pine, have in-

comes which may be made permanent and increased. Hamilton County, with a reasonable tax, encourages forest investment, and turpentine operators are extending their forest properties. But in Bradford County the confiscatory tax prohibits successful forest investment and restoration on much of the land. Washington County, with a fair present income, is depleting its stand and must drop out of the picture in the future. Osceola County is cutting its virgin timber and with generally poor sites and less than 10 per cent restocking has practically no possibilities of future profitable timber operation.

FOREST TAXES IN FLORIDA⁸

A review of forest land taxes in 10 Florida forest counties revealed average taxes in two counties of \$0.09 and \$0.13 per acre, while the other 8 ran from \$0.19 to \$0.56 per acre and year. Such taxes in many cases strangle private investment in second-growth pine lands.

Comparisons of the ratio of 1929 assessment to sale value (years 1926-29) of 142 "improved" (farm) properties with 102 "unimproved" (forest) properties scattered through 5 forest counties show a ratio for the improved properties of 29 per cent, but for the unimproved properties 53 per cent. This inequality of assessment is one large cause of the excessive tax burden on Florida forest land. Another is the escape of personal property and non-property income from taxation and the pyramiding of taxes on real property generally. Of course the heavy bonded indebtedness of many Florida counties is one of the basic causes.

CONCLUSION FOR THE NAVAL STORES FOREST

1. Taxes are one of the largest factors of cost in private investments for growing the naval stores pines and are prohibitive

⁸Florida's Forest Land Problem, Bul. No. 6, Florida State Forest Service, J. J. Goulden, 1931.

or highly excessive in many counties of the region.

2. Where taxes are reasonable, and soil and climate are favorable (site index 65 or higher) young stands of longleaf and slash pines of fair stocking (0.16 normal or better) at 1929 prices (which were below the 1922-30 average) show promising financial possibilities for private forest management. Protection from fire and hogs is assumed.

Even planting bare land of good site index to slash pine appears to be a good investment where protection is reasonably effective. Rotations as low as 48 years appear financially satisfactory.

3. The largest factor in the failure of investments in second growth pine lands is the lack of a sufficient number of trees per acre on the income side, coupled in some cases with excessive taxes on the cost side.

4. The economic background of southern pine seems set for stronger stumpage markets within ten years.

THE LUMBER PRODUCTS PINE TYPE POLK COUNTY, TEXAS, SURVEY

Polk County lies in southeast Texas. Lumber, cut by large mills, is the principal product. Approximately 60 per cent

TABLE 2

INCOMES AND TAXES OF FOREST LANDS IN BRADFORD, HAMILTON, WASHINGTON AND OSCEOLA COUNTIES, FLORIDA

Item	Bradford	Hamilton	Washington	Osceola
<i>Gross Products</i> (Naval stores, lumber, grazing, etc.) value per acre	\$4.86	\$3.68	\$3.25	\$3.42
<i>Stumpage on forest income</i>				
<i>Cash income</i>				
Naval stores leases				
Cups per acre	9.3	8.9	4.0	2.3
Lease value per cup	\$.0345 ¹	\$.0378 ¹	\$.0374 ²	\$.0289 ¹
Lease value per acre	.32	.34	.15	.07
Depletion	0	0	.08	.07
Accretion	0	0	0	0
Sustaining lease value per care	.32	.34	.07	0
<i>Stumpage</i>				
Stumpage value per M bd. ft. pine	\$5.97 ²	\$5.69 ²	\$5.00 ¹	\$8.00 ¹
Stumpage value of cut per acre	.80	.36	.41	.91
Depletion	.53	.00	.31	.88
Accretion	0	.21	0	0
Sustaining stumpage value of cut per acre	.27	.57	.10	.03
Total cash income received	1.12	.70	.56	.98
Total sustainable cash income	.59	.91	.17	.03
<i>Other income</i>				
Income from fuelwood per acre ³	\$.01	\$.01	\$.02	\$.02
Income from grazing per acre ⁴	.16	.09	.14	.08
<i>Total sustainable forest or stumpage income per acre</i>	\$.76	\$1.01	\$.33	\$.12
<i>Taxes per acre</i>	\$.56	\$.13	\$.22	\$.20
<i>Percentage taxes take of sustainable income (per cent)</i>	74	13	67	167

¹ Actual sale value.

³ Fuel wood is usually not a cash income.

² Appraised value.

⁴ One-quarter of grazing income credited to open forest range.

METHODS OF SURVEY

of the forest area is owned by eight large owners, but farm woodlands are also important and make up almost half of the farm area. Loblolly, shortleaf, and longleaf pines are found in this county, with sites (heights of trees at age 50) averaging as follows: loblolly—80 feet; shortleaf—70 feet; and longleaf—60 feet. Of the total area of the county, about 82 per cent is forested (71 per cent pine and 11 per cent hardwoods). Table 3 shows areas, stands, and increments in the various classes of stands.

Table 3 is based upon an inventory made by running parallel strips 5 miles apart across the county and taking sample plots at one-fourth mile intervals on these strips. In addition to a stand tally, dead pines with bark intact were recorded for mortality (dead pines hold their bark for two years), and sample trees, mathematically selected, were bored for increment and age and measured for height and diameter. Results were plotted and curved.

TABLE 3

AREAS, VOLUMES AND CURRENT ANNUAL INCREMENT, BY CLASSES OF TIMBER STANDS, POLK COUNTY, TEXAS

Type	Area	Per cent of total county area	Present average pine volume	Current annual increment of pine
	Acres	Per cent	Bd. Ft. per acre	Bd. Ft. per acre
Total land area	778,880	100.00		
Non-forested area	135,964	17.46		
Forested area	642,916	82.54		176
<i>Pine land</i>	556,482	71.44		203
<i>Old field pine</i>	17,481	2.25		391
Merchantable	11,654	1.50	7,628	587
Unmerchantable	5,827	.75	0	0
<i>Other pine</i>				
Original longleaf area	286,496	36.78		188
Virgin	3,885	.50	7,811	1
Culled	19,424	2.49	2,533	415
Second growth				
More than 25% longleaf				
Better than 25% stocking	7,769	1.00	4,682	459
Less than 25% stocking	35,934	4.61	2,072	200
Less than 25% longleaf				
Better than 25% stocking	24,279	3.12	5,515	549
Less than 25% stocking	62,155	7.98	2,141	231
Cut-over, restocking				
More than 25% longleaf	13,596	1.74	385	80
Less than 25% longleaf	67,011	8.60	248	74
Cut-over, not restocking	28,164	3.62	302	49
Deforested area	24,279	3.12	0	0
Shortleaf-Loblolly area	252,505	32.41		207
Virgin	21,366	2.74	10,385	1
Culled	8,740	1.12	6,263	491
Second growth				
More than 25% stocking	30,106	3.87	6,678	631
Less than 25% stocking	78,665	10.10	2,966	271
Cut-over, restocking	96,147	12.34	233	73
Cut-over, not restocking	10,683	1.37	329	57
Deforested area	6,798	.87	0	0
Hardwood bottom	86,434	11.10		2

¹ Virgin stands evidence no increment due to the natural balance between growth and decay.

² No growth measured in hardwoods.

To obtain increment, stands were reduced for one year's mortality, trees were increased for a year's growth (average of ten years) in diameter and height, and new volumes obtained, and these less original volumes gave current annual increment. Reductions were made in each stand for defect, and utilization was based on present practices. The total cut for the county and costs of lumbering and growing timber were obtained from operators and from other sources. Depletion or accretion in the total woodlands was shown by total growth and total cut. Appraised stumpage values were calculated according to Forest Service methods, but an allowance of 6 per cent interest on value of manufacturing plant and working capital was included as a cost.

FINANCIAL ANALYSIS

The total sale value of finished forest products (lumber, ties, fuelwood, etc.) cut in the county in 1929 was \$3,074,541, or \$4.78 per acre of forested land. The actual average value per thousand board feet, lumber scale, of all stumpage bought or cut by operators from their own land and valued in tax income reports was \$6.19 for pine and \$3.73 for hardwoods. The pine stumpage cut includes some virgin timber and much good quality second growth and the price is not excessive. The appraised stumpage value of second growth stumpage cut by the larger mills into lumber is only \$3.50 for pine and \$4.48 for hardwoods, indicating that the sale price of pine lumber in 1929 was low and out of proportion to wages and other costs. On the other hand the value of \$6.19 per thousand board feet for pine including virgin timber is probably high for future value of second growth stumpage.

The income per acre of forest land based on stumpage cut at values paid or assumed by operators for 1929 is as follows:

	Cash Income	Value of fuelwood used on farms
Pine	\$.898	\$.004
Hardwoods	.186	.006
	<hr/> \$1.084	<hr/> \$.010
Total income per acre of forest land = \$1.094.		

STAND ACCRETION

The total cut of pine in the county in 1929 was 93,660 thousand board feet, while the increment was 113,000 thousand board feet, indicating that the present cut could be increased about 20 per cent. However, with the disappearance of the virgin timber and probable increase of poorer grades of second growth in future cuts it is not unlikely that much of this 20 per cent increase in growth may be lost in stumpage values. The present income from pine of \$0.90 per acre of forest land is therefore assumed to increase only slightly or to \$0.95 per acre. No definite growth figures were obtained for hardwoods, which are cut chiefly from bottomland, but it is apparent that, as the high quality hardwoods are cut, they are not being replaced by thrifty young hardwoods. It is doubtful if the growth equals more than 25 per cent of the cut. The income of \$0.19 per acre of forest land should therefore be reduced to about \$0.05 per acre. The total sustainable income per acre of forest land is therefore \$0.95 for pine and \$0.05 for hardwood, or a total of \$1.00.

COSTS AND NET INCOME OF GROWING TIMBER

Taxes, fire protection and administration are the chief costs of growing timber. For the farmer only the first is a cost payable in cash. In 1930 the average assessed value per acre of about 400,000 acres of land with all classes of timber in Polk County was \$6.80, and the actual tax paid per acre was \$0.208. Taxes in 1929 were approximately the same. Fire protection

costs to the companies were about \$0.02 per acre per year with the state and federal government matching this amount, and administration adds about \$0.03 per acre per year. Total costs are, therefore, about \$0.26 per acre per year for companies, and about \$0.21 for farmers, and when taken from the sustainable income of \$1.00 per acre, leaves \$0.74 and \$0.79 respectively. Capitalized at 8 per cent, \$0.74 would show a value of land and timber of \$9.25 or at 6 per cent would show a value of \$12.33. Average forest land could be bought for less than \$9.00 per acre.

The average increment of pine (176 board feet) per average acre of forest land valued at \$5.00 per thousand board feet (assumed as a fair price of second-growth stumpage) gives a gross income of \$0.88 per acre. Well stocked second-growth longleaf has an increment of 459 board feet, or a gross income of \$2.30, while cut-over longleaf not restocking has an increment of 49 board feet, or a gross income of only \$0.24. Well stocked second-growth shortleaf-loblolly has an in-

crement of 631 board feet, or a gross income of \$3.16, while cut-over areas not restocking have an increment of 57 board feet, or a gross income of only \$0.28. This illustrates very well the necessity of having well stocked stands in order to show a reasonable net income.

OTHER LUMBER COUNTIES

In addition to Polk County, Texas, the following lumber counties were surveyed:

Alcorn County in northern Mississippi is typical of upland shortleaf. Small mill operations are cutting short dimension stock from small young timbers, with heavy depletion.

Beaufort County, North Carolina, in the costal loblolly belt, is growing more than the cut. Medium sized mills with lumber as the chief product are typical of this region.

Lee County, in eastern Alabama, has shortleaf-loblolly with some longleaf. Portable mills with concentration finishing plants have seriously depleted the county's timber. Roofer or one-inch boards are cut and sold ungraded.

TABLE 4
INCOMES AND TAXES OF FOREST LANDS IN LUMBER COUNTIES¹

Item	Alcorn	Beaufort	Lee	Hempstead
Gross products (lumber, ties, etc.) value per acre	\$3.89	\$5.26	\$7.79	\$1.90
Cash income				
Appraised stumpage value per M bd. ft. of pine lumber	5.05	5.05	5.31	5.67
Stumpage value of cut per acre ²	.86	.84	2.00	.33
Depletion per acre	.33	0	1.30	0
Accretion per acre	0	.38	0	.56
Sustainable stumpage value of cut per acre	.53	1.22	.70	.89
Income from fuelwood per acre	.13	.04	.13	.15
Total sustainable stumpage income per acre	.66	1.26	.83	1.04
Taxes per acre	.13	.29	.15	.10
Percentage ³ taxes take of sustainable income	20	23	18	10

¹ Figures in this table are from preliminary reports and subject to slight changes.

² Includes lumber, ties, pulpwood, etc., but not fuelwood. The stumpage value for different products varies and is not that given for lumber.

³ Cut-over counties with lands having poor second growth and a low percentage of agricultural land would generally show a much higher percentage of the forest income taken by taxes. This is caused both by a smaller forest income and by a higher tax per acre resulting from the smaller tax base.

Hempstead County, in southwestern Arkansas, is characterized by shortleaf-loblolly farm woodlands. Lumber cut by portable and medium sized mills is far less than the growth of the fairly well stocked farm woodlands.

Union Parish, in northern Louisiana, is representative of loblolly-shortleaf cut-over land restocking fairly well and with an unusually large proportion of old field stands. Large and medium sized mills were found. The cut and growth have not yet been computed as field work has just been completed.

Table 4 shows the value per acre of gross forest products, also value of stumpage, depletion or accretion, sustainable income and taxes for all of the counties described above, except Union Parish, data for which have not yet been worked up.

CONCLUSIONS FOR THE LUMBER COUNTIES

1. Taxes are not a prohibiting factor in growing timber in the lumber counties studied, and cannot be called excessive in these. But it should be noted that these are not among the poorest restocking cut-over counties.

2. Here, as in the naval stores counties, the density of stands is the largest factor in determining profitability of growing timber.

3. With reasonable stocking, timber growing appears financially possible in most regions and should become increasingly so as the cut is reduced through depletion and a larger proportion is used in home consumption in competition with lumber shipped in and which bears a freight rate handicap.

COMMENTS¹

By HARRY LEE BAKER

State Forester, Tallahassee, Florida

IT seems to be the intention of the author at the outset to justify, in a general way, the financial aspect studies as applies to timber growing in the South. I refer to the discussion of sub-marginal farm lands, the "new public domain," the area in farms and farm woodlands, the lumbermen's interest in these studies and to what is said about timber depletion in the South. I find myself confused as to the purpose back of these statements and conclude that they are intended to establish the fact that there are land and timber depletion problems in the South of interest to many and for which solutions are sought.

It is difficult to justify these financial aspect studies entirely for the reasons

given. In fact, it seems to me that there is but one general reason why these studies should be made, namely to determine "the possibility of profitable reforestation under different forest condition in the different forest regions." Such studies will, of course, extend to any land or timber growing problem.

It is becoming generally known these days that the owners and prospective owners of forest land are anxious to obtain reliable information regarding the probable net returns from their properties as now handled or under simple forest management. Studies of the financial aspect of timber growing are as much justified as the study of cost and return for any business enterprise and it should

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

not require much discussion to establish this fact.

If the need for these financial aspects studies is accepted as not only desirable, but necessary, the next logical step is to determine just what land ownership, timber growing or utilization problems should be studied first. There follows a list of those study projects which seem to me to be most desirable in that part of the South where the naval stores industry is established.

1. Complete the ten county financial aspect studies to obtain average figures concerning costs and returns for different groups of owners and operators, and for the different timber types.

2. Initiate case studies in slash and longleaf areas, of good site quality to determine probable future net returns to the owners under simple forest management.

3. Case studies of longleaf areas, medium site, to determine probable future net returns to private owners under simple forest management.

4. Case studies in poor, sand-ridge lands to determine whether or not such lands can be managed at a profit by private individuals. If unprofitable, determine if it would be a wise public policy to place these lands in National or State Forests. (This is really the "new public domain" problem, but these studies could be extended to areas considered sub-marginal from an agricultural point of view.)

5. Case studies for typical farm units to determine the proper function of timber growing in diversified agriculture.

6. Study the elements of cost for the woods and still phase of the naval stores industry to determine present and probable future net returns under destructive and conservative operating methods. Such studies should extend to areas well, medium and poorly stocked with turpentine trees.

7. Regional studies to determine probable future demand and prices for the wood products to be derived from the areas where case studies will be made.

Of course, there are many study projects that could be suggested. I have endeavored to confine my suggestions to existing problems. It seems to me that all agencies interested in forestry extension are sadly in need of specific and reliable information that can be given to the owners of the types of timber and classes of land as above outlined. If timber growing is profitable, let us go to the land-owners with this good news. If it is not profitable, we should have the facts to justify any change in our forest taxation laws.

The paper by Ziegler shows clearly the nature of the information that has already been collected in these county surveys; project one as I have listed them. A most significant statement to my mind is that the net annual forest income as computed for one county stands at 74 cents per acre and represents an 8 per cent interest return on a \$9.00 per acre investment. These figures apply to a depleted timber stand. Based on future increased production, following a few years of simple forest management, it is estimated that the net income will be \$4.20 per acre, or about 6 times as much as in the present day. Another interesting fact brought out by the survey is that in one county 74 per cent of the net forest income is taken by taxes.

These are typical statements taken from the paper by Ziegler and similar to many that are to be found in these county fact-finding surveys. Without the facts, extension foresters cannot hope to interest many people in timber growing as a profitable business enterprise. I, therefore, recommend these financial aspect studies to the careful consideration of all extension foresters.

COMMENTS¹

By C. F. KORSTIAN

Director, Duke Forest, Duke University, Durham, N. C.

THE paper by Dr. Ziegler and Mr. Bond just presented is very enlightening in showing that taxes in the naval stores region and in most parts of the South the small number of trees to the acre large enough to yield satisfactory incomes are two of the greatest obstacles to growing southern pine timber economically. The authors assume that protection of the forest from fire and of longleaf pine from hogs is to be assured.

At this point it is interesting to note that Forbes and Bruce² consider that there are four main obstacles to timber growing in the South where natural conditions are for the most part decidedly favorable. These obstacles are (1) frequent forest and grass fires, (2) methods of taxation which tend to eat up possible returns from timber growing even before they accrue and which encourage rapid depletion of timber stands through heavy cutting, (3) the competition of apparently unlimited supplies of virgin timber, and (4) the unfamiliarity of landowners and public alike with all aspects of timber growing. All will doubtless agree that the control of fires is a necessary prerequisite and that a better informed and forestry-minded populace is highly desirable if not essential to timber growing in the South. Since the forestry extension and research programs of the entire country are directed toward the achievement of these objectives they will not be considered further, except to comment on one point made by the authors. They apparently attribute the decrease in the area

of farmer-owned woodland over the period from 1910 to 1929 to the lack of appreciation on the part of the farmers, especially the southern farmers, that forest land is a financially attractive investment. Perhaps it might be better to think of the forest area of the ordinary farm as an asset secondary to or supplementing that part of the farm that is under cultivation. With the decrease in fertility of the tilled land, the inability of the farmer to purchase commercial fertilizer in sufficient quantities to make a crop, and the marked decline of the farm crop market, especially for the staples, cotton, corn, tobacco and peanuts, much of the hitherto agricultural land has become distinctly submarginal for the production of agricultural crops. The farmers cannot hope to make a living from the small area of forest land on each farm even though it were in a good silvicultural condition as to density of stocking, growth rate, and maturity. Much of the cultivated land has simply had to be abandoned and necessarily the forested land along with it.

I am glad to note that in our section of the South we have very little if any of the "new public domain" to which the authors refer as being surrendered in large areas to the State for the non-payment of taxes. Our people are as yet apparently optimistic for they are still paying the taxes.

The increase in stumpage price forecasted by the authors should not be passed without comment. Most forest economists will probably agree that better

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

²Forbes, R. D. and Bruce, Donald. Rate of growth of second-growth southern pines in full stands. U. S. Dept. Agri. Circ. 124. 77 p. 1930.

stumpage markets are in sight for those who can successfully weather the storm, but will they agree that the increase will come in 10 years as predicted by the authors? When the rapidly waning supplies of virgin timber are practically exhausted and when all the cut of the southern pines will be used in the South, we can confidently expect an increase in price at least equivalent to the freight costs of competitive lumber coming in from other regions instead of having to deduct from the selling price the freight costs to distant competitive markets as is now the case with the excess of production over local consumption.

I question the advisability of using as high a figure as eight per cent in computing the rate earned on the investment without explanation.

It is somewhat surprising that Messrs. Ziegler and Bond, after picturing the present situation with reference to the economics of timber growing in the South did not consider, at least briefly, possible solutions to the problem. Even at the risk of appearing to rush in where economists may fear to tread let us consider for a few minutes possible remedies for our present economic ills. As a solution to our forest conservation problem in America, Mason and Bruce³ advocate sustained yield forest management, assisted by mergers, economic selective logging, improved distribution including trade extension, and reduction of pressure to cut timber by tax reform, better protection, and better financing. This plan is excellent as far as it goes but it seems to me that it does not go back far enough into

the basic field of land economics. My own views on this matter coincide so closely with Recommendations 6, 12 and 13 of the National Land Utilization Conference, which was held in Chicago, Illinois, November 19-21, 1931, upon the call of Secretary Hyde of the U. S. Department of Agriculture and the executive committee of the Association of Land-Grant Colleges and Universities, that I shall quote them.⁴

There still remains another problem not yet adequately emphasized, namely, the proper land value or capitalization of the land which produces the timber crop. The question of whether any timberland owner will make a profit upon a future timber crop depends upon whether he capitalizes the land too high. This question must be faced squarely and with the full realization that land values must be kept relatively low, pruned of false or speculative elements and in the last analysis based on their true productivity for timber crops. We cannot hope to grow timber profitably on land bought at from \$50 to \$250 per acre for agricultural or speculative purposes, applying these prices to our financial calculations. It can be done, however, if true productive-capacity capitalized values are used. With a proper recognition of the true value of timber land by the owner and by the public for purposes of equitable taxation, all but the poorest forest land can be made to pay a dividend when the next crop is harvested, especially if protection and administration charges are prorated according to the earning power of the land.

³Mason, D. T. and Bruce, D. Sustained yield Forest Management as a solution to American forest conservation problems. 47 p. Portland, Oreg. 1931.

⁴U. S. Dept. Agri. The Official Record 10:369-371, 375. Dec. 5, 1931. (Omitted by the Editor. For text, see pp. 115-117, JOURNAL OF FORESTRY, Jan. 1932.)

SOME FINANCIAL ASPECTS OF COOPERATIVE FOREST PROTECTION¹

By FRED MORRELL

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In this paper, his third upon the subject, the author further analyzes the gaps occurring between actual contributions toward forest protection and those considered of minimum adequacy, and the diversity between federal, state and private contributions in one forest region as compared to another. He discusses the policy that should obtain in the division of financial responsibility between the three agencies and the forces that limit its realization. He believes that the lack of stability of forest protection efforts in many states is due to the lack of the states themselves supplying a sufficient share of the cost. The article offers no direct suggestions to solve the problems but is intended to offer those interested an analysis of the situation as a basis for its consideration and study.

IN THE April² and May³ issues (Volume 29, 1931) of the JOURNAL OF FORESTRY, I presented some discussions regarding the progress that has been made in forest protection since the passage of the Clarke-McNary Act, and drew attention to some of the problems with which those administering the act have to deal. While what I shall say today will, I hope, be complete and understandable within itself, it would be desirable that anyone wishing to go fully into the whole subject of federal and state coöperation in protection consider it in connection with the papers referred to, and in connection also with a good deal of other material that it is not possible to present in detail within the scope of an article or talk of the usual length.

It is unfortunately not possible to give more than general statements or averages in a short paper, and averages do not serve to bring out either the strong or weak points of a system. I can tell you that about 60 per cent of the state and privately-owned land is now under some form of organized protection; that about half of the funds estimated as necessary for reasonable protection of all forest lands are now being made available; that

there are approximately 129,000 fires per year, and about 47,000,000 acres burned over annually. That of funds budgeted for the fiscal year 1932, 57 per cent are state, 19 per cent private, and 24 per cent federal, and make other statements as to averages, or conditions in general. From such statements you may conclude that things look good, bad, or indifferent, but specific strong or weak places, or effective or ineffective points in the coöperative undertaking are not apparent to you. I am for this reason inserting in the text a tabulation, too long to follow if read aloud, but to which I will refer, and copies of which I will be glad to furnish anyone desiring to study them. It, together with the diagrams to which I will refer and the tables given in the JOURNAL articles referred to, serve to bring out some, though by no means all, of the detail needed in consideration of the results to date and the future prospects of coöperative fire protection as now constituted.

PROTECTION OBJECTIVE

Foresters have almost universally expressed the belief that all of the Nation's forest land should be given a reasonable

¹ Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

² The 25-25-50 Ratio in Financing Fire Protection. Pp. 520-523.

³ Forest Fire Protection—A National Interest. Pp. 724-728.

degree of protection from fire. In fact, I cannot recall having seen a statement from any person who has interested himself in the forestry question that disagrees with this general plan. Accepting it as the objective, we are now about half way.

AVAILABLE FUNDS

There has been a steady increase in funds made available, and in extension of protection. State organizations through which federal coöperation can be carried on now exist in all but one state where needed, and a form of organization may be worked out in that State that will make it possible to start a coöperative project within the near future. Coöperation has been discontinued in two states, but the difficulties will probably be removed within a few years so that the projects can be resumed. While there is much need for improvement along organization lines, future progress depends primarily on availability of funds with which to expand and intensify protection effort.

FEDERAL FUNDS

The Clarke-McNary Act, as amended, allows for federal coöperation with qualifying states in amounts not in excess of funds provided by state and private owners. But at the time the act was under consideration, it was believed that private owners should, and could be induced to pay one-half of the protection costs. The act, therefore, authorized appropriations of \$2,500,000, 25 per cent of what was then estimated as necessary, in the expectation that the states would provide an additional 25 per cent and the land owners the other fifty. Thus we had the usual federal and state 50-50 set-up for supplying the public's share of the funds.

Federal appropriation for the current year is just about sufficient to provide 25 per cent of the current national budget, and if it were used to reimburse each state

in direct proportion to state and private funds expended, each would receive from Uncle Sam about 25 per cent of its total budget. That policy has not been pursued, most of us think, wisely, and under the practice of giving more help to those states whose funds are less in proportion to what is to be done, the federal percentage of the total budget varies from about 12 to 50 per cent. (The smaller percentage shown for a few states in Table 1 is due to the fact that federal allotment is based on previous years' expenditures, and will be increased as these states get under way.)

PRIVATE FUNDS

The tabulation shows that private owners are putting up somewhat less than one-fifth instead of one-half of current expenditures, and less than 10 per cent, as against the 50 per cent of the total needs that they were expected to bear. This is not particularly encouraging when looked at in total, and even less so if analyzed by states.

To begin with, approximately 75 per cent of all private expenditures are in the five northwestern states, where they constitute about 60 per cent of moneys expended for protection of privately-owned land, and where the primary interest of land owners is to protect mature stands and improvements. Private owners in these states are spending a great deal of money to protect cut-over lands, but in that region of devastating fires, cut-overs must be protected in order to protect uncut stands, and there is steadily increasing evidence that the owners may withdraw from protection of a large percentage of the cut-over areas, as their virgin stands are cut out. The total funds budgeted for the current year in these five states is about 75 per cent of estimated total needs, but 60 per cent of present funds for protection of privately-owned lands comes

from the land owner. The necessity for protecting cut-overs along with mature stands will prevent any sudden collapse, and the growth of young stands will result in values on some of the cut-over land before nearby virgin stands are completely removed that owners will continue to protect. But we cannot expect

that protection will continue over all of the cut-over lands in this region unless the public pays a substantially larger share of the bill. In those regions where private protection has been initiated on cut-over lands, we may expect a reasonable, perhaps, in some cases, a rapid expansion, but on the whole the amount now

TABLE 1
PROTECTION FUNDS BUDGETED BY COOPERATING AGENCIES
FISCAL YEAR 1932

State	Estimated cost of adequate protection	Total budgeted Fiscal Year 1932	Per cent of adequate amount budgeted	Per cent of budget by			Per cent of adequate amount budgeted by		
				State ¹	Private	Federal	State ¹	Private	Federal
Maine	342,000	372,381	109	86	---	14	94	---	15
N. Hampshire	131,000	73,997	56	67	10	23	38	5	13
Vermont	57,000	20,544	36	41	21	38	15	8	13
Massachusetts	169,000	171,440	101	81	---	19	82	---	19
Rhode Island	17,000	18,260	107	87	---	13	94	---	13
Connecticut	76,000	85,338	113	81	3	16	92	4	17
New York	378,000	419,524	111	83	---	17	92	---	19
New Jersey	128,000	165,153	129	84	---	16	108	---	21
Pennsylvania	364,000	319,940	88	84	---	16	74	---	14
Delaware	12,000	25,398	212	95	---	5	201	---	11
Maryland	73,000	85,271	117	85	1	14	99	2	16
Virginia	397,000	97,395	25	57	6	37	14	2	9
W. Virginia	312,000	110,000	35	53	19	28	18	7	10
N. Carolina	632,000	116,243	18	46	5	49	8	1	9
S. Carolina	378,000	68,794	18	26	25	49	5	4	9
Georgia	775,000	150,699	19	11	43	46	2	8	9
Florida	847,000	131,478	15	25	25	50	4	4	7
Alabama	573,000	112,590	20	18	33	49	4	6	10
Mississippi	563,000	74,808	13	29	21	50	4	3	6
Louisiana	434,000	149,125	34	39	27	34	13	9	12
Texas	434,000	101,145	23	43	15	42	10	3	10
Oklahoma	165,000	37,062	23	39	16	45	9	4	10
Arkansas	484,000	---	---	---	---	---	---	---	---
Ohio	60,000	20,531	34	65	---	35	22	---	12
Indiana	84,000	19,105	23	60	---	40	14	---	9
Illinois	77,000	---	---	---	---	---	---	---	---
Kentucky	212,000	39,930	19	25	27	48	5	5	9
Tennessee	245,000	52,550	21	48	4	48	10	1	10
Missouri	347,000	---	---	---	---	---	---	---	---
Michigan	662,000	573,178	87	78	---	22	68	---	19
Wisconsin	390,000	451,678	116	89	---	11	104	---	12
Minnesota	697,000	386,920	56	74	2	24	41	1	14
S. Dakota	4,500	5,284	117	79	---	21	92	---	25
Montana	190,000	99,276	52	18	53	29	9	28	15
Idaho	447,000	357,715	80	25	57	18	20	45	15
Washington	632,000	495,205	78	18	61	21	14	47	17
Oregon	584,000	413,968	71	15	61	24	11	43	17
California	969,000	764,940	79	62	17	21	49	13	17
N. Mexico	26,000	8,808	34	25	48	27	9	16	9
Nevada	13,600	1,201	9	46	37	17	---	---	---
Hawaii	5,173	4,184	81	89	---	11	---	---	---
Totals	13,386,273	6,601,058	49	57	19	24	28	9	12

¹ Includes county and town funds.

contributed in regions other than the Northwest is so small a part of the total as not to make it look particularly encouraging.

A second point in considering the private owners' contribution is that in eleven states in the East and Great Lakes region each of whose 1932 budgets provides for 75 per cent or more of estimated total needs, private funds constitute only an infinitesimal part of the whole (\$3,900 out of a total of \$2,687,562 for the eleven states). The 1932 budgets of these eleven states added together exceed the total of their adequacy figures by about seven per cent, and the sum of their budgets constitutes about 40 per cent of the national budget. Fifty per cent of the current year's budget in these states would amount to over one and one-third million dollars. This the private owners are not paying, and will not pay in the future, because the protection system in these states is organized on the basis of the public paying the entire cost. The same policy exists in a number of other states whose present budgets are less than 75 per cent of total needs.

It becomes perfectly evident then that private owners' part of the national budget cannot be as high as 50 per cent of the total unless it is greatly in excess of that percentage in most or all of the other states. Private expenditures now exceed 50 per cent of the total in four states, viz, Washington, Oregon, Idaho, and Montana, and excepting the five Northwestern States, the private funds budgeted for 1932 do not in any important forest state amount to as much as 10 per cent of the state's adequacy figure. In 15 states, the 1932 budgets include nothing from private funds.

Moneys paid by land owners in those states having so-called compulsory patrol laws have been classified as private contributions. Although collected by state

law, they are a form of special tax, and in essence there is no difference between paying for protection because state laws require it and voluntary protection.

STATE FUNDS⁴

Turning now to the question of state contributions, the states are putting up 57 per cent of total current budgets and 28 per cent of the estimated amount needed for adequate protection. Collectively then their share of the budget, as originally suggested, is over-subscribed. But some analysis is necessary for any true understanding of the situation. Only five states are providing less than 25 per cent of the current year's budgets, but 25 are providing less than 25 per cent of total needs, the amounts running as low as four or five per cent in some important coöperating states. It should be pointed out here too that in some of the states, notably Washington, Idaho, and Montana, the largest share of state funds are used for protection of state-owned lands, so that while state appropriations are relatively large, and insure protection of the state lands, the states make only minor contributions toward protection of privately-owned lands.

PROGRESS

I am inserting at this point a diagram, Figure 1, showing trend of expenditures by the three agencies during the period 1911 to 1930, inclusive. Federal appropriations are, as stated above, approximately 25 per cent of the 1932 budget, and with the understanding that now prevails, i.e., that the federal government should supply one-fourth of the total, the Bureau of the Budget is unlikely to approve increases at a rate faster than state and private funds increase. The total of private expenditures has not changed materially during the past ten or twelve

⁴Includes county and town funds.

years. There have been some very substantial percentage increases in some of the Southern States, but these have been offset by losses in the Northeastern States, where the public has assumed the whole job, and, as has been pointed out, 75 per cent of the private expenditures are in the five Northwestern States, and the percentage increase in these states since about 1920 has been small. Therefore, the total percentage increase has been small, and I think will be small at least in the immediate future.

Records of state expenditures prior to 1920 are incomplete, but it is clear that there was a steady and rapid percentage rise from 1911 to 1922, a period of no rise, 1922 to 1928, and a 100 per cent increase, 1928 to 1930.

Of the 1929 increase, about \$90,000 was spent for suppression, and \$650,000 for prevention. In 1930, state suppression costs increased over 1929 by about \$1,250,000, while prevention costs fell off about \$55,000 from the previous year. The chart lists the states that were responsible

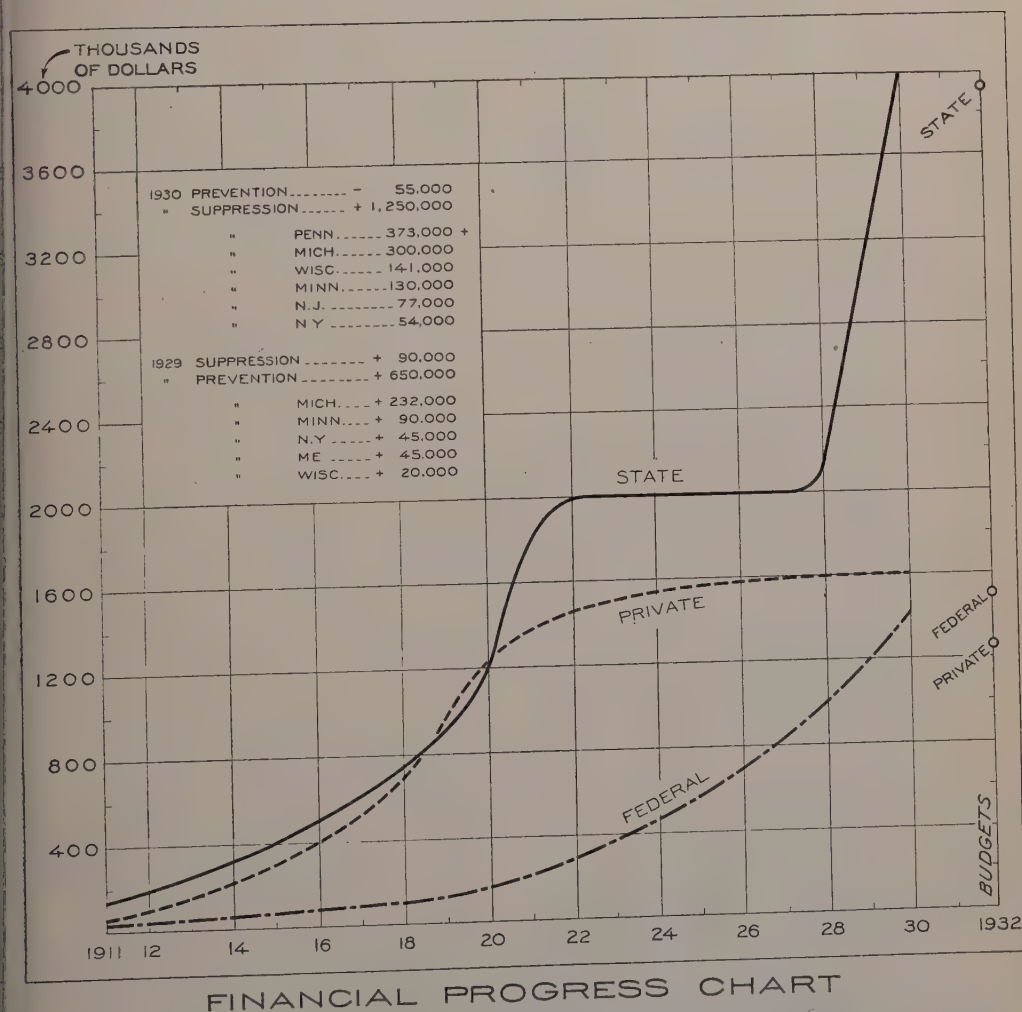


Fig. 1.—Trend of expenditures for forest protection by federal, state, and private agencies.

for the largest part of the increase. It will be noted that nearly 50 per cent of the increase is accounted for by the three northern Lake States, and nearly 20 per cent by Pennsylvania. In no southern or far western state was there an increase of as much as \$20,000.

To facilitate a ready understanding of the whole situation, I have prepared a diagram, Figure 2, showing the financial status by four major regions: First, the Northeast, including New England and the North Atlantic States; second, the North Central region, including the Lake States and Ohio, Indiana, and Illinois; third, the far western states; and, fourth, the Southern, from Maryland to Oklahoma, inclusive.

The 1932 budget for the Northeastern region is practically equal to its adequacy

figure. The states supply 82 per cent of the funds, federal government 17 per cent and private owners 1 per cent.

The North Central group budgets are equivalent to about 74 per cent of its adequacy figures, the states furnishing 80 per cent of the budget and the federal government the other 20 per cent.

In the Far West the 1932 budget is 75 per cent of estimated needs, and of funds available in 1932 the private owners supply 44 per cent, the states 34 per cent, and the federal government 12 per cent.

The 1932 budgets for the southern group are about 18 per cent of the adequacy figure and of this the states supply about 38 per cent, the federal government 42 per cent, and the private owners 20 per cent.

This shows in a general way where

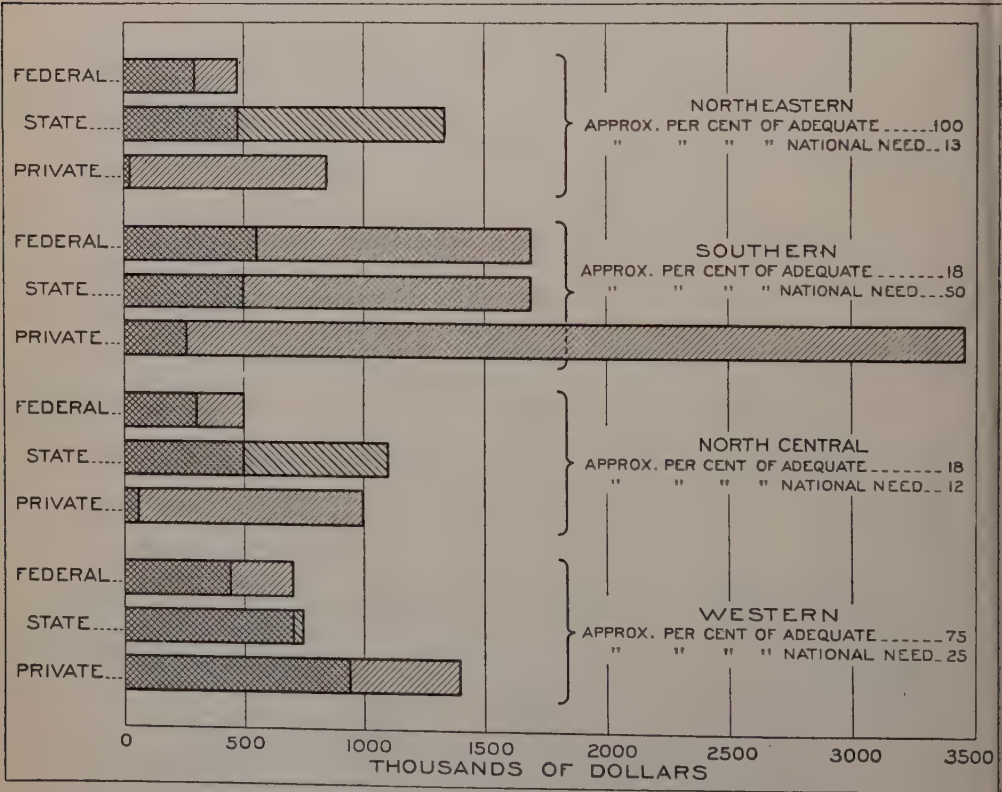


Fig. 2.—Financial status of forest protection in four major forest regions.

funds are short. The next question is, is there a fair chance of their being provided under the present financing plan. Taking the North Central region first I think the answer is "yes." The states are now providing 60 per cent of the total needed, and the federal government 14 per cent. They are relatively wealthy states and, as is shown in the progress chart, have in the last few years greatly increased appropriations for protection. If the federal government supplies its additional 11 per cent they can likely be expected to supply the other 15 per cent needed.

WESTERN STATES

California should be considered by itself since its 1932 budget is nearly 80 per cent of its adequacy figure, and the state is contributing over 60 per cent of the amount. Here again the answer is "yes." As to the four Northwestern States, the situation is not so encouraging; 1932 budgets are about 73 per cent of adequacy. The private owners are paying 60 per cent of the total bill and Uncle Sam slightly more than half of the remainder. Most of the state money is for protection of state-owned land, and the private owners are paying about 80 per cent of the cost of protecting their lands. I have already indicated my doubts as to this continuing. However, if the state and federal government could be induced to "come through" with 50 per cent of the cost for protection of privately-owned land as the national program contemplates, I think we could, with good administration, continue and possibly improve on present protection standards for a number of years at least. The immediate question here is of public rather than private funds.

Finally the South. Here the federal government is paying over 40 per cent of present total and cannot substantially increase its contribution under present laws, except as states and land owners increase

theirs. The states are now supplying about 7 per cent of the amount needed and the private owner less than 4 per cent. Something more than half of all privately-owned land is in this region, and about half of the national adequacy cost figure is allocated to it. May we expect the private owners to increase amounts now spent for protection by 1200 per cent and the states by 350 per cent; and, if so, how soon? Total contributions from private owners in this region is now about \$250,000. It has been advanced for the sole purpose of protecting young stands, and is, on the whole, certain to increase. Possible abandonment of lands now under protection does not represent a problem so far as can now be foreseen. The exceptional growth possibilities and relatively quick returns from southern forests should insure that southern land owners will be in any future procession for private protection of cut-over forest lands. But so small a percentage of the total of private protection planned has been accomplished that the objective of complete protection seems unlikely of any immediate attainment if 50 per cent of the cost is to be paid by the private owner.

FUTURE POSSIBILITIES

What about the possibility of the Southern and Northwestern states supplying the needed funds? We have just witnessed New York launching an additional \$20,000,000 forestry program; Pennsylvania and other of the Northeastern States going forward; and the northern Lake States and California increasing appropriations to the point where reasonable protection seems to be in the offing; can we anticipate a similar action in the South and the Northwest? Perhaps the biggest question lies in the relative size of the job in comparison with financial resources of the states. As an indicator of this, I have prepared a table comparing total wealth of states, as of 1922, with amounts needed

for forest fire protection. It will be noted that the ratio varies from a high of \$308,159 to 1 in Ohio down to \$2,775 to 1 in Florida. That is, Ohio could raise sufficient money to protect its forest lands by a tax of one dollar on each \$308,159 of wealth while the Florida tax would amount to one dollar on each \$2,775 of wealth. It will be noted that, excepting Maine, in all of the states which are sufficiently financed or nearly so, the ratio

is more than ten thousand to one, and that, excepting Missouri, Texas, and Oklahoma, the ratio in all of the states that are markedly underfinanced for protection, it is less than ten thousand to one.

These ratios cannot, of course, be considered as sole indicators of the relative ability of states to finance forest protection. The need for other public works may vary in an inverse ratio between two given states or between groups of states.

TABLE 2

COMPARISON OF TOTAL WEALTH OF STATES AND THE AMOUNT NEEDED FOR ADEQUATE PROTECTION

State	Total Wealth of United States 1922	Cost of adequate protection	Ratio
	(1) Dollars	(2) Dollars	(1) to (2)
Maine	2,006,531,000	342,000	5,867
New Hampshire	1,374,135,000	131,000	10,489
Vermont	842,040,000	57,000	14,772
Massachusetts	12,980,839,000	169,000	76,809
Rhode Island	1,924,326,000	17,000	113,195
Connecticut	5,286,445,000	76,000	69,558
New York	37,035,262,000	378,000	97,976
New Jersey	11,794,189,000	128,000	92,142
Pennsylvania	28,833,745,000	364,000	79,213
Delaware	625,765,000	12,000	52,147
Maryland	3,990,730,000	73,000	54,666
Virginia	4,891,570,000	397,000	12,321
W. Virginia	4,677,919,000	312,000	14,993
N. Carolina	4,543,110,000	632,000	7,188
S. Carolina	2,404,845,000	378,000	6,362
Georgia	3,896,759,000	775,000	5,028
Florida	2,440,491,000	847,000	2,881
Alabama	3,002,043,000	573,000	5,239
Mississippi	2,177,690,000	563,000	3,868
Louisiana	3,416,860,000	434,000	7,872
Texas	9,850,888,000	434,000	22,697
Oklahoma	3,993,524,000	165,000	24,203
Arkansas	2,599,617,000	484,000	5,371
Ohio	18,489,552,000	60,000	308,159
Indiana	8,829,726,000	84,000	105,115
Illinois	22,232,794,000	77,000	288,737
Kentucky	3,582,391,000	212,000	16,898
Tennessee	4,228,251,000	245,000	17,258
Missouri	9,981,409,000	347,000	28,764
Michigan	11,404,861,000	662,000	17,227
Wisconsin	7,866,081,000	390,000	20,169
Minnesota	8,547,918,000	697,000	12,263
Montana	2,223,189,000	190,000	11,700
Idaho	1,553,941,000	447,000	3,431
Washington	5,122,405,000	632,000	8,105
Oregon	3,419,459,000	584,000	5,855
California	15,031,734,000	969,000	15,512
	277,083,034,000	13,337,000	20,775

But it is believed that the relative need for public works is commonly greater in the poorer states in proportion to ability to pay, and, therefore, the ratios do in a very broad way indicate ability of the several states to finance forest protection. Viewed as a single item, a tax of one dollar on a valuation of three thousand dollars would seem easy to absorb, but from the angle of an additional appropriation of a half million dollars or more in a poor state, it looks different. For example, the total income for operation, maintenance and interest in Idaho in 1927 was less than \$5,500,000, and the sum needed for protection would mean an increase of over 8 per cent in this fund. An increase of that size will not be made unless the people in the state are greatly concerned over fire losses, and fully determined that they can and should be eliminated. We are, I think, a long way from realizing such an attitude in the states that are underfinanced.

It would, in my judgment, be impracticable for the federal government to supply more than 50 per cent of the needed fund even should Congress be disposed to do so. It is fundamental that the state which lays taxes on the land and passes and enforces laws effecting it shall be a substantial contributor to any cooperative plan for protection, and some of the most difficult problems in administration and most serious questions as to stability of the project as it now exists in a number

of states are due to the fact that the states themselves are not supplying a sufficient share of the funds. The original plan, that the federal government should not furnish more for protection in any state than the state itself supplied, was a good one and should be adhered to if at all possible. Under the cooperative plan, no state, of course, has to raise the full amount needed for protection, and large increases for protection such as have been made in Michigan and California may be made in the Southern and Northwestern states. The biggest doubt as to that rests in the data shown in the wealth-need table, Table 2.

I have attempted to analyze the financial aspects of cooperative protection when viewed from the objective stated, i.e., adequate protection of all forest lands. The gap between objective and realization is in the South too large, and is perhaps not closing as rapidly as was anticipated ten years ago, or as rapidly as some people believe that it should.

It has been the purpose of this paper to emphasize the difficulties rather than the more encouraging aspects of the situation because it is the difficulties that constitute problems in need of solution. No direct suggestions as to solution of the problems are made, because the writer does not as yet see the answer to them. The effort has been to analyze the situation as an aid to members of this Society in its consideration.

FORESTRY AT URANIA, LOUISIANA¹

BY HENRY HARDTNER

President, Urania Lumber Co., Urania, La.

Mr. Hardtner is generally regarded among foresters and lumberman as the father of large scale forestry in the South. Believing in the desirability of reforesting cut-over lands from the start he set out to apply the methods he learned from personal observation in his own forest, later taking advantage of the suggestions of visiting technical foresters. Today the names of Hardtner and Urania are synonymous of successful commercial reforestation. The Urania forest is annually the objective of many foresters visiting in the South. Mr. Hardtner is also the father of the present Louisiana severance tax law.

MY interest in forestry dates back to 1905. At that time I became aware that cut-over lands presented a serious problem. I thought first of applying the land to cattle raising but was soon convinced that it was impractical. Reforestation seemed to be the only use to which our cut-over land was suited except for certain parcels of good farm land intermingled with the timber land. At first I had to pioneer every step in my investigation of the reproduction of longleaf pine. I thought it would take from 60 to 100 years to grow a merchantable crop. No one could tell me what was possible, no yield tables such as you have now were then available. I had to work out the problem for myself. As one of the organizers of the National Conservation Congress I attended the first meeting and sat, so to speak, at the feet of the Gamaliels, hoping I could learn how to go about the job. Well, I was sure they could talk better than I, but I couldn't see where any of them were growing trees.

I started out with small plots on our cut-over longleaf land and my success in obtaining reproduction was so marked that visitors accused me of "nature faking." So I ventured out on a larger scale to prove definitely that I could grow tim-

ber. Today we have 8,000 acres fenced against hogs to protect the young trees and the land is carefully protected against fire. Old logging roads are kept open and lookout towers give a good fire detection service. Our fire record has been good, only 2 per cent of the area being burned every year. I hold that it is the most damnable heresy in the country that forests can be improved by annual burning. Nothing is further from the facts. Fires of course have some good functions. At the present time I am coöperating with Professor H. H. Chapman in the silvicultural use of fire for the reproduction of longleaf pine and I fully endorse what he has written upon this subject.

All of our reforestation is by natural means, enough seed trees being left to assure plenty of seed for the land cut over around them. We have never resorted to planting and I don't believe it to be necessary if we leave seed trees.

I have been operating my saw mill on the same site since 1896 and there is now more timber tributary to it than ever. The mill is on a perpetual basis. I don't want a bigger mill. Its present size is just right to cut the same amount each year forever—the amount the land is capable of producing, or about 20 million board

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, December 29-31, 1931. Mr. Hardtner spoke extemporaneously. The above article was prepared by the editor from notes and makes no pretense of being a complete report of the address.—Ed.

feet per year. The annual growth per acre varies from 250 to 500 board feet per acre.

The problem of taxes on growing timber is a big one. Our present system of taxing forest land is unfair. Forestry without tax adjustment is impossible. There should be a small tax on the land each year and a large tax when the tree

crop is cut. My taxes are now \$30,000 per year and to assure their payment in the future and to safeguard the forestry venture I have set aside \$250,000 in a trust fund to take care of them. In spite of the persecution of politicians and interests that are unfavorable to my efforts, I intend to go on with my present plan of reforestation.

FORESTRY AT ELIZABETH, LOUISIANA¹

By B. F. SMITH

Vice-President, Industrial Lumber Co., Elizabeth, La.

How a southern lumber company in the longleaf pine belt came to consider forestry, why it adopted it, and what it expects from it, is here described by one of its officials. Like many other southern pine operators, faced with serious cut-over land problems, this company felt that the future of logged-off lands lay in agricultural uses and it went ahead vigorously to develop the possibilities, only to meet with failure. The company now reforests its cut-over lands by artificial means and manages them for pulpwood production. Although Mr. Smith feels that forestry on a large scale is a function for the federal and state governments, he is convinced that, on a smaller scale and for special purposes, it is feasible in the longleaf pine region for private capital.

THE INTEREST of the Industrial Lumber Company, of Elizabeth, La., in forestry—or, more correctly speaking, in reforestation, is of comparatively recent origin. This interest was encouraged more as a partial solution to our cut-over land problem than any other thing. The Industrial Lumber Company is a manufacturer of lumber, owning its timber lands in fee. As its operations progressed it found itself with an ever-increasing acreage of cut-over lands. In our early inexperience this fact did not greatly disturb us, because we knew these lands, as a whole, were fertile, and, of course, when the time was opportune, we would have no trouble in disposing of them for farm development. (Whatever else I may say in this paper, I want you to know that we still believe our lands of the South are generally adapted to successful agricultural development, and if there is a demand for them for that purpose, I believe they should be first devoted to raising food and clothing for our people.) So, in 1912, in all confidence we started on a farm development and land selling program, and there followed, over a period of from ten to twelve years a most remarkable chain of events, the chronological detail recital of which would be very interesting to you,

but time forbids. I said a remarkable chain of events, remarkable in several respects; remarkable from the standpoint of time and money spent; remarkable from the standpoint of undiscouraged effort in the face of rebuffs; remarkable from the standpoint of unique and ingenious land-selling ideas, but gentlemen, remarkable *most* for its utter failure.

We established a large demonstration farm, under the supervision of a practical and experienced farmer, to demonstrate to the prospective purchasers the adaptability of our lands for general farming, truck-raising and horticultural purposes. We stocked this farm with common and blooded herds of cattle and hogs to show the farmers the advantages and possibilities of a balanced farm development—you see we *did* believe in our lands—we built a twenty-thousand-bushel sweet potato curing plant to assure our farmers of a certain market and contracted to pay the highest going price for their potatoes, and we offered to rent storage space in our plant at ridiculously low rental charges to the speculatively inclined farmer, so that he might reap for himself the profit that offered on a delayed market; we built a modern canning plant, supervised by a canning expert, to further convince the farmer that he could sell

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

what produce he raised; but with all of this, no one came to buy our lands. Mindful of the old copy-book admonition "if at first you don't succeed, try, try again," and that other homely adage, "perseverance wins," we persevered. Like the old negro who prayed to the Lord to send him a turkey and none came, then he prayed to the Lord to send him after a turkey and he got one. No one came to buy, so we went out to get buyers. We employed a high-pressure salesman and advertising agent, and sent him forth to the northern farming centers to get customers—timing his visit to the winter season, thinking that the sales argument of our moderately warm and open winters permitting outside farm work for the 365 days of the year, to the snow bound farmer of the North would be availing. In this connection, however, one farmer frankly declared that he had no inclination to move *anywhere* that he had to work 365 days a year. To care for this vast influx of farm buyers as they came, we employed an agricultural agent to assist them in the selection of farm sites and to advise with them in regard to crops and methods adapted to this section; we offered them lands at less than one-half the price that other colonization plans were selling them—probably therein lies our mistake—and on ultra-generous terms, agreeing to build for them homes and farm buildings, and other structures, at cost to us for labor and material. The Industrial Lumber Company expended in excess of \$150,000 in its efforts to sell cut-over lands, and still no one came to buy. I said we were persevering—sometimes we are caused to wonder if perseverance is a virtue after all. You can well imagine that by this time we were doubtful, and began to lose some of our confidence in farm development as any part of the solution of the cut-over land problem, which by this time was reaching gigantic proportions in the erstwhile timbered South. In my opinion, that problem, the profitable use of our vast acreage of

cut-over lands, is the greatest economic problem crying aloud for solution today, the final solution of which will redound in greater happiness and prosperity to the people of the South than any other one thing. We were accumulating cut-over lands at the rate of about 4,000 acres a year, properties, like the lily neither toiling nor spinning, which so far as practical purposes were concerned were "frozen" assets. I hope that word is well chosen, I have heard it used frequently of late. Taxes were steadily growing higher, and the value of the lands was rapidly growing less, at least in our opinion of them. We could not sell them—so what were we to do with them? We could let them revert to the state for taxes, but as citizens of the South, we thought we had no right to shift a burden on the state that was not profitable for us to carry ourselves. I am beginning to have a change of heart in this regard.

We had thought of reforestation, but not seriously, in spite of the frequent and sometimes urgent importunities of Mr. R. D. Forbes, who was then State Forester for Louisiana. Granting the ultimate success of growing timber on cut-over land, the work should be carried on by the federal and state governments. If we *were* convinced that private capital should accept any part of the responsibility of supplying timber for the future, the life of our operations would still be so limited we could not see the justification for our entering into a business that would take from thirty to forty years to mature. I still believe, that, as a general proposition, the timber for future generations should be grown by the federal and several state governments. I am sorry to observe, however, that our Southern States are not accepting as large a portion of this responsibility and opportunity as they should.

About this time we began to hear about the pulp and paper industry. Here was an industry that had profited in the North, but the northern supply of pulp wood

was very rapidly approaching depletion, and the industry would have to import its pulpwood, or move South where there was already a vast quantity of pulpwood and where young timber would grow more rapidly than in the North. Here was our opportunity, an opportunity to profitably utilize our cut-over lands, perpetuate our company, our town and our community,—three things we greatly desired. We approached the proposition carefully and judiciously, we think, seeking advice from those authorities who knew our location—Mr. Forbes, Dr. Austin Carey, Professor H. H. Chapman, Mr. Henry Hardtner and others. On the advice of Dr. Carey we spent considerable time at Bogalusa with him, and with Mr. J. K. Johnson, visiting the forests of the Great Southern Lumber Company, and studying their methods—absorbing inspiration as it were, and I want to say here that it *was* inspirational to see what they had accomplished, and to talk with them of what they expected to do. We visited and studied Mr. Hardtner's work at Urania, La., and our confidence grew; finally our plans matured, and we started in the work.

It won't take long to tell you what we have done. I will not tell you how we have done it. Methods are academic. We had our lands generally classified as to present reproduction and soil types to determine the extent of the replanting necessary, entered into a reforestation contract with the state on 24,000 acres of land, entered some 60,000 acres under fire protection contract with the state, established a pine tree nursery, and proceeded with the routine of the work. We haven't accomplished a great deal, so far as visual results are concerned, when compared with some operations. We have preferred to go slowly at first, until we were more sure that we had gained the confidence and cooperation of the country public. Aside from our protection from fire of some 60,000 acres of what we believe will naturally reproduce, we have planted 5,-

204 acres, which cost us, on the average, \$3.74 per acre, not counting protection. I have prepared a cost statement of our yearly planting and accumulatively, and will be glad to have those who might be interested look over our figures. (See Table 1). Of this planted acreage, 699 acres is planted in longleaf pine, 2,014 acres in loblolly pine, and 2,491 acres in slash pine. We got about 85 per cent results from our planting, and all that lived are growing nicely.

We have had troubles galore—dry weather, ants, rabbits, goats, gophers, moles and fires, but we have been able by one means or another to cope pretty successfully with all of them including fire. We are rapidly convincing the people of our community of the physical success of the idea to grow trees on the land from which trees were cut. The fact that we try to give a large part of this work to the country citizen, the planting and protection, and pay them well for it, has convinced them of the financial success of the venture, at least successful so far as they themselves are concerned. Our insistent campaign against fires and other depredators, sometimes at considerable cost, has convinced them of our sincerity and earnestness in the work. Since we keep a careful accounting of costs, we are able to show them that our entrance on a reforestation program is not to evade taxes on our lands, which is a charge usually made against lumber companies embarking on this work.

Withal we are very well satisfied with what we have done, but we do not believe we have been in the work sufficiently long to permit us to predict the measure of our future success. One adverse fire year might destroy all of our physical accomplishments. We have gone sufficiently far with the work of artificial reforestation, however, and have observed the effects of natural reforestation sufficiently close to say that, outside of the possibilities of fire destroying reproduction, reforestation is

TABLE 1
COST STATEMENT OF TREE PLANTING
INDUSTRIAL LUMBER CO., INC.
ELIZABETH, LA.

	1925-1926	1926-1927	1927-1928	1928-1929	1929-1930	1930-1931	Total
Cost of seed	\$ 89.62	100.68	20.00	528.25	856.08	598.80	\$2,193.43
Cost of nursery work	447.00	349.00	82.00	725.22	963.85	1,006.44	3,573.51
Cost of lifting from nursery	25.00	78.00	3.25	149.11	275.15	191.00	721.51
Cost of seedling purchased	—	175.00	—	460.50	150.00	350.00	1,135.50
Cost of hauling to field	2.50	35.75	—	193.80	238.35	174.00	644.40
Cost of plowing rows for planting	17.50	144.00	7.75	430.45	535.50	551.45	1,686.65
Cost of planting	195.42	732.50	27.00	1,745.30	1,832.55	1,455.20	5,987.97
Miscellaneous expense	—	—	—	211.00	387.00	211.00	794.50
Cost of replanting	2.50	393.30	—	—	—	2,764.96	3,158.26
Total	\$779.54	2,008.23	140.00	4,443.63	5,232.48	7,302.85	\$19,484.73
Number of seedlings planted from nursery	80,500	177,000	11,700	644,000	1,720,000	1,700,000	4,333,200
Number of seedlings purchased	—	151,000	—	307,000	100,000	200,000	758,000
Total seedlings planted	80,500	328,000	11,700	951,000	1,820,000	1,900,000	5,091,200
Number of acres longleaf planted	11	211	13	202	275	—	699
Number of acres loblolly planted	—	148	—	617	1,036	200	2,014
Number of acres slash planted	77	—	—	225	689	1,500	2,491
Total acres planted	88	359	13	1,044	2,000	1,700	5,204

\$3.74 per acre
758,000

surely feasible even in the longleaf belt, and we believe that reforestation by private capital in a small way for special purposes, and by the federal and state governments in a very much larger way, is the final solution of the idle land problem of the Nation. Certainly it is of the South.

I have recited to you our travails antedating our entrance in a reforestation program. I have told you rather hurriedly what we have done. Now, what of the future—we expect to proceed along the lines

of practical forestry, to plant such lands as need planting, and to protect from fire all possible of such of our lands as we believe have possibilities of natural reproduction, to the ultimate purpose of providing an ever ready supply of pulpwood. You see, we have a paper mill now, built before the fateful year of 1929 parenthetically speaking, which in spite of the already forty per cent overproduction of Kraft paper, we must keep operating. Let us hope the storm will be tempered to the shorn lamb.

COMMENTS¹

By G. D. MARCKWORTH

Professor of Forestry, State College of Agriculture, Athens, Georgia

Mr. Smith has brought out a number of points in his paper which are worthy of comment, however, I did not receive his paper until just before this meeting so my remarks are largely contemporaneous.

If nothing else, Mr. Smith has emphasized the futility of colonizing cut-over lands in the longleaf pine belt. Hundreds, and perhaps thousands of efforts similar to that of the Industrial Lumber Company have been made in every southern state, and personally I have yet to see one which has been successful. One of the surprising things to me is that even after twelve years of failure, and the futile spending of over \$150,000, Mr. Smith still thinks that cut-over lands in the South are "generally adapted to successful agricultural development."

As Mr. Smith stated, the attempted colonization began in 1912 and continued for ten or twelve years. If you study the agricultural development in the United States during this same period you will

find that there was a general expansion which took in some 45,000,000 acres of new farm land. This development was general throughout the country with one exception, and that was in the longleaf pine belt of the South. The reason for this was, and still is, that these lands are not as well adapted to agricultural crops as other lands in the United States. Much might be said about their fertility and their adaptability to agriculture, but time will not permit. It is sufficient to point out that they are not fertile, and that the trend in agriculture is toward the cultivation of the more fertile lands which are favorable to the use of machinery, and toward the abandonment of the poorer lands. For this reason, it is doubtful if the lands in the longleaf pine belt, with a few exceptions, will ever become successful farming enterprises and are only fitted for the growing of timber.

The Industrial Lumber Company did not begin the practice of forestry or the growing of a new crop, until they were convinced that it was economically sound,

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La. December 29-31, 1931.

and they could be reasonably certain of a fair return on their investment. In that they are not different from other lumber companies, or other industries. The trend of commercial timber owners toward forestry at the present time is not due so much to the educational work of foresters and others, as it is to the fact that these timber owners have been convinced that timber growing pays. This little-studied phase of forestry is the basis on which forestry must succeed or fail.

Mr. Smith, I believe, differs from many lumbermen in advocating the growing of timber by the state and federal governments. Most lumbermen are afraid of government ownership of timberlands. In many sections of the country, however, it is the only salvation, for private individuals cannot afford to make the necessary investment and then wait years before they receive any return. This is largely the condition we find in the cut-over lands of the South. There are millions of acres which will only return to timber production through a relatively large initial investment and a long period of waiting before there is any return. It is most unfortunate, as Mr. Smith points out, that the southern states are not accepting their responsibility through state forests. We find that even some of the smaller states of the North, as Maryland or Connecticut, have more land in state forests than is found throughout all of the Gulf States.

To you from other sections of the country, Mr. Smith's summary of his planting costs should be particularly interesting. A total cost of \$3.74 per acre over a period of six years, with the cost of replanting included, must seem almost unbelievable. However, this is fairly representative of the cost throughout the South, and together with rapid growth, emphasizes the importance of the South as a

timber producing section, and one in which timber can probably be grown at less expense than in any other section of the country.

Before closing my remarks, I would like to bring out one more point. The Industrial Lumber Company, over a period of twelve years used every known means at its disposal to "put over" their agricultural program at a net loss of over \$150,000. It hired expert farmers, high pressure salesmen, expert advertising agents, and expert farm marketing specialists. It also bought the best cattle, hogs and farm supplies and equipment it could find to assure success of its program. What would have happened had these same methods been applied to a forestry program? Imagine, if you can, such methods applied by all these lumber companies in the South which squandered huge fortunes in agricultural colonization. Had this been done, these companies would have something more than red ink to show for their efforts and there would be no cut-over land problem in the South today.

When the Industrial Lumber Company and other lumber companies began their agricultural programs, as pointed out before, they hired experts. They did not trust to ordinary farmers. Unfortunately they have not followed the same methods in developing their forestry program. The production of a timber crop requires greater skill than the production of agricultural crops. The lumber companies throughout the South need men in charge of their lands who have been thoroughly trained in the methods of growing timber. Only with such men in charge can they be assured a return on their investments in planting and seed trees, as well as on their pulp mills and other manufacturing plants in the future.

THE ROLE OF FOREST PRODUCTS IN RAILROAD REVENUE¹

By S. R. YOUNG²

Atlanta, Ga.

The author discusses the interdependence between the railroads and the forest industries, the railroads looking to the forest for revenue-producing tonnage and the forest industries upon the railroads for markets for cross ties and other products. He also shows how the prosperity of the railroads in forested sections rises and falls with exploitation and depletion of timber tributary to their lines, and how second-growth in some cases has been the means of reviving forest products tonnage.

THE DISTRESS of the railroads during the past year has called to the attention of the American people that there is a very close relationship between our transportation system and our economic well being. Our entire economic life is dependent upon an adequate transportation system.

Transportation is second only to agriculture among our important industries. The Interstate Commerce Commission's report for the year ending December 31, 1929, shows that the Class I railroads of the United States have an invested capital of \$26,223,527,239. They employed for the year 1929, 1,660,850 people and paid them \$2,896,566,351. They buy twenty per cent of the steel, twenty per cent of the fuel oil, and twenty per cent of the timber used in the United States.

Someone has said that there are three main factors responsible for our great national and individual wealth:

1. Natural resources,
2. Individual economic freedom,
3. Transportation.

The net operating income of our railroads this year will be approximately forty per cent under that for 1930, and 1930 was thirty per cent under 1929. As a result the margin over fixed charges has been lowered to a point which threat-

ens the solvency of many railroads. During the past two years over 300,000 employees have been laid off. Over half a million cars are idle. The number of employees in the maintenance-of-way department has been reduced approximately thirty per cent and the expenditures for maintenance of way and structures, labor and material, has been reduced approximately fifty per cent.

This decrease in employment is partly due to a recession in business that has taken place in every industry. It has been influenced also by a steadily increasing use of machine equipment. It is, however, largely the result of a change in the railway industry incident to the diversion of a large volume of traffic to other agencies. We are doing over sixty per cent less passenger business than was done ten years ago.

Reforestation of waste lands, forest fire protection, prevention of soil erosion, and the development of private and state-owned forests is unquestionably an existing and also increasingly important problem in the Nation.

I became interested in forestry during my school days when it was pictured to us that one of life's most indispensable necessities was greatly imperilled. That idea still persists and one finds many

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people who look upon the forestry associations as bodies of altruistic men waging a fight, doomed to failure, to preserve and restore a vanishing industry.

The notion that every tree cut means that much additional forest destruction and that, therefore, the important way to help "Save the Forests" is to use less lumber, is surprisingly well rooted in the mind of the public.

Due to widespread misunderstanding regarding conservation, the idea has gone abroad that the use of substitutes for wood is necessary to preserve the forests. This is not true. Were my own knowledge confined wholly to what I see along the lines of the railroads for which I work, I would still hold to this view.

There are no cross-ties along the line of the Atlanta and West Point Railroad and the Georgia Railroad that can be economically used except they be treated. The available pine ties which we are treating are very soft and coarse grained, and are not going to show the tie life generally expected of them. It is encouraging to have observed along these railroads the tremendous second-growth lumber operations now about completed in a territory from which the original timber was removed many years ago. But for this second-growth timber it would have been impossible for the Georgia Railroad to have made operating expenses during the three or four years following the advent of the boll weevil and the drop in the price of cotton following the World War.

The number of cars of forest products originating on the Georgia Railroad in 1921 was seventeen per cent more than in 1920 and in 1922 it was twenty-seven per cent more than in 1920. The business of the Georgia Railroad in forest products continued to increase until 1925 when the revenue from forest products was one hundred and eighty per cent more than it was for 1920. The total railway operating revenues for 1925 were

seven per cent less than they were for 1920. After 1925 there began a decline in this business.

For the year 1930 the business of the Georgia Railroad in forest products was sixty-four per cent under that of 1925. The total business of the railroad from all sources in this same period had declined only twenty-four per cent. In 1925 forest products represented 11.5 per cent of our business, and in 1930, 6.1 per cent.

Had our business in forest products declined from the peak in 1925 at the same rate that the total business of the railroad declined, the percentage of decline of the total revenues of the railroad in 1930 under 1925 would have been twenty instead of twenty-four and the year 1930 would have shown a greater net income in the operation of the railroad than it did the year 1929 which was a fairly satisfactory year.

Forest products have always constituted a most important commodity in the traffic tonnage of our railroads. So long as our railroads are privately owned and operated for profit, they will be vitally interested in forest products. No other commodity group bears such an important part in determining the cost of maintaining railroad property and at the same time represent such a large part of its revenue producing tonnage.

The census of 1929 shows the aggregate gross value of all goods produced in the United States to have been \$92,070,000,000, of which the South produced \$19,000,000,000. Manufactured products come first; farm products second; mine and quarry products third; and forest products fourth; with a value of 1,100,000,000, or 1.2 per cent of all goods produced.

The 1930 tonnage statistics for the Class 1 railroads show manufactures and miscellaneous first; products of mines second; products of agriculture third; and forest products fourth. Forest prod-

ucts produce 6.5 per cent of the tonnage and 7 per cent of the revenue.

The production of naval stores in the southeastern states is an industry, which, in that region, is exceeded in importance only by agriculture and lumbering. The annual value of the South's naval stores industry is approximately thirty million dollars. Perpetuation of this industry depends upon the restoration of the forests of yellow pine and development and use of methods of turpentineing which will assure continuous growth of the trees.

So far as the lumber industry is concerned there is certainly every reason why the lumber dealer should be sympathetic toward the railroads. I think it would be difficult to point to a single instance in which auto truck lines are indispensable to the lumber industry, or in which they even contribute importantly to its welfare. On the other hand the lumber industry owes its present development largely to railway service. It fared well with this service for years before the bus and truck lines were ever heard of, and it could not get along without railroad service now.

And while it is true that the railroads have been a big contributing factor to the development of the forests it should not be overlooked that the forests have been equally as vital to the progress and up-building of the railroads.

Our forefathers sought destruction rather than utilization of our forests but had made little progress in clearing the great forests of this country until the advent of the railroad. Until this time the forests were reproducing themselves as fast as they were being cut.

Logging roads were built over mountains and across the plains. Some were abandoned when the timber adjacent to them was cut, while others were developed into great common carriers. Actual figures are not available which would show what the forests meant to the railroad in traffic and revenue during the

early days, because no accurate record of loadings were kept as they are today. However, the tonnage consisted almost entirely of farm and forest products and these two products made up a very large proportion of the tonnage until well after the Civil War. Roads that prospered when the original timber was being cut and then struggled along for years on traffic that barely kept them going, have again become prosperous from the lumber operations in second-growth timber and also in timber previously considered valueless. The tonnage of these commodities, as a whole, increased until five or six years ago; though for many years past the percentage of forest tonnage to total tonnage handled has been decreasing. This being due to the tremendous increase of certain other commodities. The percentage of forest products tonnage to total tonnage on southern and western railroads runs much higher than it does on eastern railroads, because these roads operate through forested territory of greater extent. From the very beginning the railroads have looked to the forests for many essential necessities.

The railroads are interested in the development of new uses for wood to replace those captured by other materials, the modernizing of existing wood uses and the adaptation of wood to complex and changing requirements.

The railroads are interested in the perpetuation of their supply of timber and are giving their moral support to all agencies that will take from them the necessity for growing their own timber. The Atlanta and West Point Railroad, The Western Railway of Alabama, and the Georgia Railroad are coöperating in every possible way through their agricultural department with the forestry departments of Georgia and Alabama, and with the United States Forest Service. It has been the pleasure of our railroads to devote considerable space in its Agricultural Bulletin to discussions of forestry

articles prepared by these three agencies.

Our railroads would scarcely be possible without the forests which supply them with a hundred million crossties per year and give them material for the majority of their freight cars.

Wood always has and always will play a most important part in railroad activities, for no material has as yet been developed which so well combines the essential of qualities of lightness, strength, resilience, ease of working, and availability.

The sum and substance of all criticism against wood is its lack of durability, which is substantially due to abuse to which it is subjected after it reaches the consumer. While wood may readily be protected against natural deterioration or decay by chemical treatment before placing, with positive assurance that it will be serviceable for the full mechanical life of the part, steel must be continuously painted with rust and acid resisting paint to protect it against early failure because of corrosion.

Treating timber for wooden railway structures will increase the cost twelve per cent to fifteen per cent, but for this expenditure there is anticipated one hundred per cent increase in life. The American Railway Engineering Association sponsors the statement that creosoted wooden trestles are more economical than concrete except when cost of the concrete structure is less than one and one-half times the cost of the wooden structure. The railroads have found after long experience that grade separation structures built of treated timber will probably last as long as so-called permanent structures and cost but one-half to one-third as much.

The major portion of the wood that is given preservative treatment in the United States consists of timber required in the maintenance of the rail transportation systems of the country.

In addition to being economical,

treated ties, by reducing demand for replacement, offer the most effective means of checking the steadily increasing cost and difficulty in obtaining tie timber, and a reduction in replacement demand will play its part in assuring an adequate supply of tie timber for future years.

The annual cost of crosstie renewals is the largest single item of maintenance on the railroads. While the present annual requirement of over a hundred million may ultimately, through use of creosote treatment, be reduced to perhaps as low a figure as three-quarters of a million, this alone will not prevent the depletion of the supply. One must indeed be optimistic to believe that forest conservation, reforestation, and a decreasing demand due to creosoting will result in a perpetual supply of wood ties and this without a substantial increase of cost per railway tie.

It is generally recognized that the quality of material in the tie is of equal importance, at least so far as economy is concerned, with the quality of structural timber. A few years ago a tie in the track cost little more than the price paid the producer. Now a tie in track costs two or three times the price paid the consumer. To the original price must be added the freight, hauling into and from the treating plant; the interest on investment while it is seasoning; the cost of adding for the tie plates; boring for the spikes; and applying the preservative treatment. It is equipped with two large tie plates and four to eight, sometimes ten, spikes, and anti-checking devices. It does not pay to do all this to any but perfect ties.

Despite the fact that wood preservation has been practiced for 100 years or more and that the industry has been developed almost exclusively by and for the benefit of the railroads, it is only within the last ten years that the use of treated wood products has been universally adopted by these agencies themselves.

The fact that lumber has to be shipped into deforested regions has materially affected prices of wood building material. The average rail haul is probably over 500 miles. The great increase of the length of haul in recent years accounts for much of the increased cost of lumber.

Frequently the retail price of lumber has exhibited such a marked instability during periods when freight rates were relatively stable, that it is reasonable to conclude that other factors are of greater importance in affecting price than transportation costs.

A carefully planned national reforestation policy would substantially reduce the average length of haul from forest to consumer.

On the other hand if waste lands and unprofitable farm lands are used for the growing of timber as a product, the prosperity of the communities will be increased and the railroads will be bene-

fitted, not only because there has been created new tonnage in forest products but also through the increase in the quantities of all commodities used by the community.

The time when railroads were called upon merely to transport tonnage offered them as the exclusive means of transportation has passed. The railroads are interested in the creation of new tonnage to replace that lost through competition and the depletion of the original timber supply. It would seem as if forest planting and conservation would be of utmost importance to the railroads, not only to produce tonnage in forest products and provide its maintenance and construction materials but also for economic reasons. For conservation, preservation, and economic utilization of the products of the forests will add to the prosperity of our people and in doing so will increase the revenues of our railroads.

FORESTRY AND THE HARDWOOD-USING INDUSTRIES¹

BY DONALD R. BREWSTER²

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Our remaining commercial hardwood forests are urgently in need of at least a crude kind of silviculture according to the author. He estimates that remaining merchantable hardwood timber cannot be expected to supply high grade lumber for more than 30 years at the present rate of cutting. Since more than fire protection is needed to insure the continuous production of high quality hardwood lumber, measures to provide for future growth should be inaugurated well in advance of the final removal of the present old-growth commercial stands. Taxation reform and an increased program of acquisition of hardwood lands for federal and state forests are recommended together with enlarged research on hardwood forestry by the federal government.

HARDWOODS contributed approximately one-third of the total volume of forest products removed annually from the forests of the United States, based on estimates of the U. S. Forest Service covering the years from 1914 to 1922. (Footnote: Table 22, Stat. Bul. 21, Pt. 1, U. S. Dept. Agri.). It is reasonable to assume that the proportion is approximately the same at the present time, since the decline in production of softwoods and hardwoods in the past decade has been approximately proportional. The total value of all forest products annually removed during those years is estimated to be \$2,232,015,000. Using the one-third proportion, this would make the hardwoods worth about \$720,000,000, but it is probable that hardwoods are sufficiently more valuable than softwoods per unit that their total value was close to \$1,000,000,000 yearly. These hardwood products as estimated in this same table, reduced to a board foot basis, are given in Table 1.

During the nine years since 1922, the production of hardwood products of most kinds has steadily decreased until, during the present year of industrial depression, the amount is probably less than half of the above total. During the last normal year,

1929, it is estimated that production was about two-thirds of the above figures, or the equivalent of about twelve billion feet, board measure. With a return to more normal industrial conditions, we may expect a resumption of approximately this volume of production as long as the available supply of timber permits, assuming that the increase in population will about balance the inevitable substitution of alternate materials for some of these hardwood products. About half of this production will be lumber and sawn material, the remaining half being made up of the other products listed, the estimated value being at least \$500,000,000.

Assuming, then, that our industries will require a sustained production of about six billion board feet of lumber and the equivalent of six billion board feet of other hardwood products, what is the probability that our hardwood forests will be able to supply this demand? In 1920, it was estimated (Footnote, Table 4 and Table 8, State. Bul. 21, Pt. 1, U. S. Dept. Agri.) that we still had left the hardwood forest listed in Table 2.

Assuming that half of our area of hardwood forest land is at a standstill as far as annual increment is concerned and

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that the balance is adding to its stock of usable material at the rate of from 17 to 25 cubic feet per acre per annum as estimated under present conditions in Table 12, Sta. Bul. 21, Pt. 1, U. S. Dept. Agri., and that one cubic foot can be conservatively considered to equal 6 feet board measure, we have an estimated annual growth in our hardwood forests as shown in Table 3.

On the further assumption that our hardwood forests are being depleted from fire and insects, disease, and windfall at the rate of 1,500,000,000 board feet as estimated in the above mentioned Table 22, the net annual increment may be estimated at 8,896,101,000 board feet. Deducting this from our assumed annual requirements of 12,000,000,000 board feet we have a net depletion of 3,103,899,000 board feet which, multiplied by the 11 years since 1920 makes a total of 34,142,889,000 board feet. Deducting this

from the stand of 459,675,000,000 board feet estimated to be on hand in 1920, we have a stand at the end of 1931 of 425,532,000,000 board feet. If our net depletion should remain at 3,103,899,000 board feet, our present estimated supply of hardwood timber would last about 137 years.

It is evident, from the above figures, that our hardwood forests are ample to provide for our present requirements indefinitely, if reasonable measures are taken to protect these lands from fire and if no important reduction in area occurs through the clearing of additional lands for farming. During the past decade, there has been an appreciable increase in the area of hardwood forests due to the abandonment of sub-marginal farm lands which have been allowed to revert to timber growth. The trend in agriculture for some years past has been toward the more intensive cultivation of the more fertile and accessible lands and the abandon-

TABLE 1

HARDWOOD PRODUCTS ANNUALLY REMOVED FROM THE FORESTS OF THE UNITED STATES

Kind	Unit	Quantity	Equivalent in lumber sawed from same trees (thousand cubic feet)	Equivalent in standing timber (thousand board feet)
Fuel wood	Cords	700,000,000	3,500,000	6,650,000
Lumber, dimension and sawed ties	M bd. ft.	9,425,000,000	9,425,000	2,064,075
Fence posts	Number	180,000,000	165,000	360,000
Ties, hewed	Number	56,000,000	1,680,000	672,000
Pulp wood	Cords	435,000	195,000	48,700
Mine timbers	Cu. ft.	146,500,000	439,500	197,775
Cooperage:				
Tight staves	M staves	262,500	399,000	87,450
Tight heading	M sets	19,200	141,800	31,000
Slack staves	M staves	900,000	240,400	52,800
Slack heading	M sets	45,000	166,500	36,490
Hoops	Thousands	120,000	21,500	7,080
Distillation wood	Cords	1,400,000	185,000	120,000
Veneer logs	M ft. log scale	489,600	587,520	90,000
Tanning extract wood	Cords	1,000,000	87,000	95,000
Poles	Number	918,000	55,000	11,700
Vehicle stock, woodenware, handles, etc.	M bd. ft.	197,700	197,700	45,070
Piling	Pieces	330,000	40,000	7,800
Excelsior wood	Cords	160,000	60,000	18,720
Export logs and hewn timbers	M bd. ft.	50,000	50,000	9,200
Total			17,635,920	10,604,860
M=1000				

ment of the less fertile hillside and other marginal lands and this trend may be expected to continue for many years to come, particularly in view of the modern tendency toward a steady decrease in our annual growth in population.

Students of sociology are predicting that our population will become prac-

TABLE 2

HARDWOOD LANDS INCLUDED IN OUR PRESENT FOREST AREA, 1920

Region	Hardwood forests (1,000 acres)	Hardwood saw timber (Million board feet)
New England States.....	9,500	11,319
Middle Atlantic States.....	17,128	29,504
Lake States.....	28,950	69,350
Central States.....	56,962	133,152
South Atlantic and East Gulf States.....	27,300	83,750
Lower Mississippi Valley.....	36,201	132,600
United States.....	176,041	459,675

tically stationary before many years because of the steady decrease in the size of the average family due to the demands of civilized life. This same development will tend to prevent an increase in our present consumption of hardwood products. This, and the growing use of alternate materials in place of wood, should result in a stationary or even decreasing demand for hardwood products, in the years ahead.

Even though we may be justified in assuming that we shall always have an am-

ple volume of hardwood products available, however, we cannot overlook the question of quality, if we are to continue to supply our industries with the high grade lumber they need. It is here that scientific forestry must be utilized if we are to provide for our future hardwood requirements. During the more than three hundred years since the settlement of this country began, we have drawn lavishly upon our supplies of fine-quality virgin hardwoods with little or no thought for the future. Most settlers, faced with the necessity of opening up their forested lands for farming, found it necessary to burn their hardwood trees after picking out what they needed for their own buildings and fences. It is difficult to estimate how many billions of feet of our finest hardwood timber had to be sacrificed in this way to permit the raising of food and forage crops.

Later, with the coming of railroads and power driven machinery, and the tremendous increase in the demand for hardwood products with which to build and furnish homes, hardwood lumber companies took up the task of converting tracts of virgin timber into lumber and other forms required by hardwood users. Gradually our great hardwood lumber industry of today, with its billions of dollars invested in timberlands, sawmills, dry kilns, and remanufacturing plants, was developed. This industry has supplied an abundance of high grade Ameri-

TABLE 3

ESTIMATED ANNUAL GROWTH OF HARDWOOD FORESTS

Region	Hardwood forests (1,000 acres)	Annual growth rate cubic feet	board feet	Total increment (Million board feet)
New England States.....	9,500	12.5	75	700,000
Middle Atlantic States.....	17,128	12.5	75	1,284,600
Lake States.....	28,950	10.0	60	1,737,000
Central States.....	56,962	12.5	75	4,272,150
South Atlantic and East Gulf	27,300	9.5	57	1,556,100
Lower Mississippi Valley.....	36,201	8.5	51	1,846,251
Totals.....	176,041			11,396,101

can hardwoods not only to our own industries but to scores of foreign countries the world over where the supply of virgin hardwoods has not been equal to the demand. In no other country has there been such a wealth of high quality hardwood timber to draw upon nor such a development of large scale methods of manufacture and distribution.

Thus have American hardwoods acquired their dominant place in the timber markets of the world. Thus has it been possible to furnish our industries with an ample supply of high-quality, low-priced hardwood products such as interior trim and flooring and furniture for our homes, cross ties for our railroads, fixtures for our stores, frames and wheels for our wagons and automobiles, packages for our fruits and vegetables, boxes and crates for our goods, woodenware for our kitchens, toys for our children, backs for our brushes, handles for our tools and brooms, shuttles and spools for our textile industries, heels for milady's shoes, and caskets for our final exit from life's joys and cares.

Until recent years, our supplies of virgin hardwood timber were considered inexhaustible and the hardwood lumberman saw no further than the conversion of this timber into useful products, thinking to continue his business merely by moving from one tract to another with no thought as to the production of new crops on land cut over. Nor did the forester give much concern to the perpetuation of hardwood timber production, assuming that most hardwood land was potentially valuable for agriculture and would be cleared for crop lands and pastures. We now find, however, that the end of our virgin hardwood forests is definitely in sight and that the production of high quality lumber from such forests cannot be expected to continue on the present scale for more than twenty or thirty years, by which time most of our large bandmills will have ceased to operate and the hard-

wood industry as we know it today will have passed out of existence. It is high time that the forestry profession undertook seriously the task of putting a sufficiently large portion of our hardwood lands under management so that we may look forward to a future supply of hardwoods that will not only be sufficient in volume but will also supply future generations with the quality products such as lumber that will be needed if our present standards of utility, comfort, and beauty are to be maintained.

The problem of land use and the maintenance of local and regional prosperity is also involved in this perpetuation of our hardwood production. If our vast areas of hardwood land are not used to produce new crops of timber, they will, to a large extent, become non-productive since they will have small value for grazing or agriculture. Hardwood-using industries will be forced to close down, thousands of workers will have to seek other employment, the commercial and financial framework of community life will be destroyed in hundreds of towns and cities, and tax-paying capacity will be reduced to the point where public services will have to be curtailed or discontinued. Business and professional interests throughout the hardwood regions and manufacturing districts will suffer a tremendous falling off in income and resources and large sections of our country will be forced to carry on on an impoverished basis. Surely this prospect deserves the constructive thought and prompt action not only of the forestry profession but of commercial interests, civic clubs, and public officials.

Maintaining hardwood lands in a condition to produce high quality products requires more than fire protection, although that is, of course, the first step. The thoughtless conversion of virgin timber is apt to leave the forest in a condition of low productivity in which the growing stock consists largely of inferior

species and the establishment of reproduction of the more valuable species is partially or entirely prevented. The cost of establishing a stocking of these valuable species by planting or seeding will in many cases be prohibitive and the restoration of the forest to a profitable condition may require a long period of years or may be impossible without the expenditure of a sum of money which the owner can hardly hope to recover. On most hardwood lands the only practicable method of maintaining valuable timber production is to undertake forestry measures while there is still sufficient merchantable timber on the ground so that the harvesting operation can carry the cost of the measures required to insure the development of a new growing stock of valuable species.

It is for this reason that no time should be lost in promoting the wide-spread adoption of at least a crude type of forest management on our present merchantable hardwood lands. Because of this situation, the need for adopting some form of forest management in the cutting of our remaining merchantable hardwood forests is probably more critical than in any other type of American forest. The legislatures of hardwood states should take prompt steps to adjust tax methods so as to encourage the adoption of forestry measures by private owners. The states and the federal government should largely increase the rate at which hard-

wood lands are being acquired for state and national forests, since small private owners can hardly be expected to undertake the production of such a slow-growing crop under temporary or uncertain land tenure.

The federal government should immediately increase its appropriations for research in hardwood forestry in all of the hardwood regions in order to provide the technical information that is needed as a basis for intelligent and successful management of these lands. This wide-spread resource cannot be expected to maintain its annual production of approximately half a billion dollars in new values and income without the expenditure of an adequate sum for research. The public interests involved are sufficiently vast to justify ten times the present expenditure if the work is to go forward at a rate comparable with agricultural research and rapidly enough to meet the future needs that can now be foreseen.

Much more might be said in regard to our hardwood situation in relation to forestry. It is hoped that this short paper may serve a useful purpose in emphasizing the need for action and in stimulating the forestry profession to take a position of militant leadership in the important task of securing the adoption of prompt measures to perpetuate an adequate production of hardwood timber for the use of our industries.

THE NATIONAL ASPECTS OF SOIL EROSION AND FLOODS AND THEIR CONTROL BY VEGETATIVE COVER¹

By SCOTT LEAVITT²

Congressman from the Second District, Montana

Congressman Leavitt gives a very clear, direct and comprehensive picture of the agricultural, industrial and social losses that result from erosion and floods, and which may go on inconspicuously but in the end attain calamitous proportions. He discusses the causes and their correction from a national viewpoint. He recognizes that floods cannot be prevented entirely and that the erosion and flood problem varies with local conditions. At the same time he accepts the function and importance of engineering works but emphasizes the necessity of supplementing such works and making them more effective by "nature's own methods of protection through a forest or other natural vegetative cover." He proposes legislation for a more comprehensive national program of research that will sift out facts from surmise.

IN ANY consideration of the problem of flood control, a study of soil erosion and its prevention must have an important place. It is my purpose to discuss with you the value of a program to reduce the washing away of the land, both in its bearing upon the conservation of the lands themselves, and upon the control of water and floods. In doing this I shall refer to a legislative proposal which I introduced in the closing days of the last Congress, intended to authorize the adoption of an adequate study upon which a national program of erosion control can be based. I do this in the belief that such measures will go far toward the alleviation of the recurring disaster of floods. They will not accomplish this by rendering unnecessary reservoirs and other engineering works for control, but rather by supplementing such works and adding to their effective-

ness. It is my purpose to reintroduce this bill when Congress again convenes in December. It proposes a program important to every state in the Union with those of the Mississippi drainage, and I shall discuss it from that national angle.

It seems to be an ingrained human failing that popular interest turns to matters of deep and fundamental importance only under the stimulus of great catastrophes. When the trouble is over our fleeting concern is too apt to return to indifference. Again and again this has happened after the Mississippi floods. The consequences of these floods have become more and more disastrous, culminating in the extreme destruction from the flood of 1927. That flood inundated 18,000 square miles, cost the lives of 246 human beings, destroyed 1,500,000 head of livestock, and occasioned damages estimated at from \$300,000,000 to \$350,000,000.

¹An address before the 13th annual Convention of the Mississippi Valley Association in St. Louis, Mo., November 23-24, 1931.

²Congressman Leavitt was also the principal speaker at the annual banquet following the 31st annual meeting of the Society of American Foresters at New Orleans, on December 30, 1931. His address on this occasion was extemporaneous and touched on, in addition to the subject covered more fully in the address here reproduced, other forestry matters of national interest and concern. Congressman Leavitt spent his early life in the western forests and knows their problems from first hand experience. His address at New Orleans won for him the respect and admiration of every forester present for its thorough understanding of the technique of forest practice, the influence of forest cover and the aims of foresters. The editor regrets this address is not available for publication. It is with pleasure that he makes Congressman Leavitt's St. Louis address available to readers of the JOURNAL OF FORESTRY.—Ed.

After the flood of 1927 the American people, as usual, rushed to the aid of suffering humanity with bountiful relief. For a period national attention was focused upon the need of preventing future similar disasters. Plans going beyond any previous engineering measures for harnessing the river were put into effect. These plans will certainly result in improved control of the flood waters, but as yet too little attention has been given to another entire field of measures that may prove to be the most natural means of relief. I refer to nature's own methods of protection through a forest or other natural vegetative cover.

It is idle to talk of entirely preventing floods. They will always occur as the result of heavy rains that exceed the water storage capacity of the soil and of engineering works. The storage capacity of the soil offers a possible widespread means of flood control through the improvement of forests or other vegetative cover. At the same time such improvements promise to be one of the fundamental means for reducing erosion, checking the heavy unloading of detritus into stream channels and reservoirs, and greatly enhancing the availability of naturally stored water against the rapidly growing requirements of agriculture, industry and city life. Thus three inescapable reasons are presented for an internal development program of large scope that must be entered into systematically and energetically if the interests of our increasing population are to be properly safeguarded.

I wish to point out some of the reasons why these three problems of flood control, erosion, and the availability of water demand serious and continuous attention to the forest or other natural vegetative cover of watersheds; and why such attention is indispensable to any adequate program for the protection of our agriculture and industry and the guarantee

of ample water for irrigation and our cities.

CONTROL OF FLOODS

There is a very important place for flood control by engineering measures. It goes almost without saying, however, that the smaller the quantity of water delivered by a flood the less will be the tax upon the capacity of engineering works built to control it, and the lower will be the initial and upkeep expenses. The efficiency and the life of the flood control construction works will be increased if successful means can be discovered to retard the delivery of excessive run-off from the land. Fragmentary evidence now available strongly indicates that by maintaining the proper kind and amount of forest and other natural vegetation on watersheds, the retentiveness of the soil for water may be increased and a check placed upon the filling of reservoirs with silt and the choking of river channels by soil, sand, gravel, and rock eroded into them. This using of nature's means for flood reduction is not offered as a substitute for engineering methods but, rather, as a supplementary measure to increase the general security from flood damage. It may prove to be cheap, effective, and in the long run indispensable. It may be found to have an important bearing upon the kind and the cost of such engineering work.

Flood control is not equally attainable for all streams, and it is probably true that every stream presents its own individual problems. It is at least certain that an enormous variety of conditions are encountered on different river watersheds, calling for extensive investigations before efficient means for the general reduction of excessive water stages can be developed. Streams differ greatly in regimen, turbidity, and the influence of forest protection on their watersheds. Where streams, like many of those in the Lake

States, drain regions of low relief, with sandy soils, and where many of the tributaries are fed by lakes, there is not the degree of rapid run-off and erosion that characterizes the streams that head at high elevations, as in the Southern Appalachian region. Such streams have steep gradients, and drain areas of close-textured soils. The yearly silt discharge of streams in the Great Lakes region above Minneapolis, draining a basin of 19,585 square miles, is only 117,000 tons, compared with nearly 11,000,000 tons from the Tennessee River, which has a drainage area less than twice the size of the more northerly streams. In other words, the solid burden of the Tennessee River is about 50 times that of the streams in the Great Lakes portion of the Mississippi drainage.

While the measure to be used for reducing high flood stages will vary greatly from region to region, they must all be aimed toward the dual purpose of retarding run-off and reducing erosion. The forest or other vegetative cover of watersheds will therefore be found to be very important. Trees, with their deep-seated roots and the layers of leaf litter with which they cover the soil, appear certain to be an effective means of holding the soil in place and of keeping it in a porous, moisture-retentive condition to furnish a high degree of water storage.

EROSION

Soil erosion is now recognized as one of the greatest of national calamities. It is a direct aftermath of the destruction of our forests and the overgrazing of our range lands. Its serious consequences can be visualized from expert estimates which place the annual wastage of plant-food material washed off from fields and pastures at not less than 126 billion pounds, valued at more than two billion dollars. I do not propose, however, to discuss erosion on agricultural lands. Obviously this

in itself is a tremendous problem which cannot be taken care of by reforestation except, perhaps, in part. What I do intend to discuss is the erosion which follows the depletion of the natural cover on our forest and range lands, choking streams with debris, silting up storage reservoirs, and indirectly increasing the damage from floods.

There is hardly a deforested or overgrazed section of the United States in which *conspicuous* evidences of erosion can not be found. When it is realized that a great part of the losses are *inconspicuous*, taking place rapidly over the surface of heavily cut and burned timberlands and overgrazed range lands, even on gentle slopes, the wide-reaching gravity of this problem and its importance to the national well-being become clearly apparent.

Numberless instances of erosion and its consequences can be found in our literature, as well as in our personal experience. They tell of stream channels filled and rendered unnavigable by the loads of material fed into the tributaries by erosion and thence washed into main streams. In Mississippi, for example the Coldwater River, which 40 years ago was navigable for large boats as far as the town of Coldwater, has been made entirely unnavigable by sand bars. The channel of the Tallahatchee River could be negotiated from Batesville, Mississippi, as late as 1900 by a small steamer drawing 4 feet of water. Now the stream is choked with sand bars. The same story can be told of numerous once navigable rivers on the Atlantic seaboard. The stream bottoms are divided into shallow, tortuous channels by sand and gravel bars, the source of which is to be found in the gullies and eroded lands along the streams and at their head waters. In a broad belt over the more rolling lands near the Missouri River these severe effects of erosion are a common condition.

In the western states the toll paid to soil erosion is enormous. Countless slopes, once covered with rich soil and a dense carpet of herbaceous and browse plants capable of profitably supporting millions of cattle and sheep, have been so wasted by erosion that they can now support less than half the number of livestock that once grazed upon them. Furthermore, erosion is already endangering established irrigation projects and making prospective ones uncertain. The development and prosperity of the West will largely be determined by the water available for agriculture, power, and industry. In 1920 approximately 19,000,000 acres in the West were under irrigation, and it was estimated by the Department of Agriculture that this area could be extended to 51,000,000 acres by the conservation and development of the entire water supply. A more adequate protective covering of vegetation may be the primary means by which these watershed interests can be safeguarded.

Another heavy industrial loss properly attributed to erosion is through the deposition of silts, sands, and gravels in storage reservoirs. The value of a storage reservoir depends largely upon the duration of its service; that is to say, upon the permanency of its storage capacity. The all-important factor in determining this period of service is the rate at which erosion is taking place on the basin of the supplying stream. The life of a reservoir is the number of years which will elapse before it will be filled by the soil removed by heavy rains from the lands on its catchment areas. The failure of a reservoir due to silting is a loss not only to the agency which made the investment but also to the entire region. Many engineers, accepting siltage as a natural condition, customarily allow in their financial calculations for the amortization of the costs within the estimated life of the reservoir. The loss in investment, how-

ever, through the silting up of a storage reservoir is trivial, compared with the actual loss to the region of the reservoir site. When the storage capacity of a reservoir has once been destroyed the site can not be replaced.

There are many reservoirs that have become so silted up that only the channel of the stream remains. This is not the natural condition for most streams, the sources of which are within well-wooded regions. Observations indicate that this condition is produced very largely and often entirely through exposure of the naked soil by the removal of the protective cover of forest litter and humus. Millions of acres of land too steep or too poor for permanent profitable cultivation have been cleared, only to be abandoned. The subsequent erosion has unquestionably carried into the streams tons of silt, much of which is deposited, destroying reservoir space and increasing the cost of power, or filling navigable channels. If these deposits are removed at all, it is at the expense of the general public. The exercise of care at the source of the trouble would probably have maintained the land in some form of permanent productivity. It would have avoided much of the wasted effort in clearing it and prevented the later needless expenditure of public funds in the removal of silt beds from stream channels.

AVAILABILITY OF WATER

The problem of maintaining water supplies to meet the requirements of our growing population is far more critical than most people realize, because water is an indispensable commodity which determines whether or not human life can be maintained and agriculture developed. Secretary of the Interior, Ray Lyman Wilbur, has admirably expressed the importance of looking after our water resources in the following words:

"The real conservation problem of the

West is the conservation of water. Plant life demands water. . . . From Nebraska west, water and water alone is the key to our future. We need the mountains and the hills and a great protected back country or we cannot have sufficient water for our valleys. . . . There must be a great western strategy for the protection of our watersheds and the plant life on them. . . . We must replace homestead thinking with watershed thinking, since watersheds are primary to western homes."

In many parts of the United States water is becoming the most important and most valuable crop of forest and also of range lands, even exceeding timber and forage. This is as true of the West, as it is of the great central region and of the heavily populated sections of the East. Where rainfall is scanty, as in much of the West, people must find ways and means of getting water other than through dependence upon the small and irregular streams. The underground reservoirs have in places been tapped, but are proving inadequate. In southern California, for instance, water is being pumped from depths in excess of 400 feet and sometimes as deep as 600 and 800 feet. The flood runoff in the streams, caught by reservoirs, has likewise been found insufficient. The cities are being forced to distant streams for their water. Thus Los Angeles has been compelled to go 250 miles, across a mountain chain and a desert, for its water supply, the capacity of which has already been reached. Now Los Angeles must go 500 miles in order to obtain water from the Boulder Dam of the Colorado River. Other cities are in the same predicament, and we find municipalities like San Francisco, Oakland, Alameda, and Berkeley developing far-distant water supplies at great expense.

The water supply problem of California, however, is by no means entirely municipal. Agricultural needs, in fact, exceed those of the cities in importance. On account of the lack of water for irriga-

tion in the Great Valley of California, the state has completed a study of her water resources, the purpose of which was to find means for developing the at present wholly inadequate supplies to meet the needs of agricultural lands absolutely dependent upon water. The result was the formulation of the Marshall Plan, involving the expenditure of hundreds of millions of dollars for building reservoirs and impounding basins, diverting water from one stream to another, and opening up new supplies of water. This project is in addition to the draft upon the Colorado River, part of which also will be used for irrigation.

In the more humid East, the absolute necessity of water supplies that will be dependable in drought years was forced to public attention during the severe drought of 1930. In that year many cities came perilously near the limits of their supplies. And this domestic need for water is becoming more and more critical as the population increases. The Regional Planning Federation of the Philadelphia Tri-State District has estimated that the population of eleven closely adjacent counties of Pennsylvania, New Jersey, and Delaware, reckoned at about 3,500,000 in 1927, will have increased by 1980 to 6,446,000. Large increases in population are certain to take place in other industrial districts of the United States, and it will be difficult to supply the water necessary for its use. For industrial purposes alone, the Water Supply Commission of Pennsylvania reported in 1920 that 246 million gallons were used daily in the lower Delaware basin, out of a total daily consumption of 442 million gallons. According to the Water Policy Commission of New Jersey the "Northern Metropolitan District" of that state, which coincides pretty well with the portion of New Jersey included in the Regional Plan of New York and its environs, now uses 275 million gallons daily and in 10 to

30 years hence will require an increase of some 150 million gallons a day.

The draft on underground water supplies is frequently so great as to cause a definite lowering of the water-bearing level, and at the same time the capacity of the larger streams to supply the water requirements of cities is already being taxed in many instances. Authorities now appear to agree that it is from distant headwaters of major streams that such populous areas as northern New Jersey, Baltimore, and the suburbs of Philadelphia must draw future supplies. An idea of the magnitude of the engineering work required to supply even fairly immediate needs may be gained from the fact that the Water Policy Commission of New Jersey plans a high level development for northern New Jersey costing from \$42,000,000 to \$46,000,000, exclusive of conduits to the communities served. Even this gigantic project will not meet needs beyond 1960. The state has already bonded itself in the sum of \$7,000,000 to purchase reservoir sites for this development. Baltimore has recently completed an expensive development of the Gunpowder River, and is already obliged to look further ahead.

In view of these expenditures, running into millions of dollars, it is surprising that little or nothing has been done to find out how the use that is being made of the watersheds concerned, for agriculture or otherwise, may affect the flow of streams. We simply do not have the information to deal with individual cases, and the lack of this information is indefensible considering the importance of the question and the strong evidence pointing to the value of vegetational cover at stream heads. It is of paramount importance that this matter should be given thorough and complete investigation.

THE RELATION OF FORESTS AND OTHER VEGETATIVE COVER TO THE CONTROL OF FLOODS, EROSION, AND WATER RESOURCES

There has been much argument as to the value of vegetative cover on watersheds in regulating streamflow, conserving flood run-off, and reducing erosion. Many engineers consider engineering works all-sufficient. I do not wish to decry the importance of such work. The case in favor of them has been splendidly established by experiment and experience. A very large program of construction for the diversion and retention of flood waters remains to be carried out on numberless rivers outside of the Mississippi system. But as part of any such program the development of the natural vegetative cover of watersheds should be given serious consideration.

As yet only a few isolated and small-scale efforts have been made to determine the facts by scientific analysis. I may cite here two or three such studies that are being conducted by the U. S. Forest Service, in which all factors of the problem were measured experimentally and in detail.

An experiment by the California Forest Experiment Station has already furnished results which point to the magnitude of the influence of the leaf litter under a forest in retarding the run-off of surface water and the erosion of the soil. In this experiment two small areas are being compared, one burned bare and the other covered with forest litter. Each area received the same amount of water applied by sprays to simulate rainfall. It was found that more than 24 times as much water ran off from the bare area as from the one covered with litter. This effect in itself, considered over a large area, would be tremendous. But it is small compared with the amazing difference in the amount of soil transported from the litter-pro-

ted as contrasted with the bare area. The ratio was as 1 to 3500. In other words, this experiment tends to show that 3500 times as much soil may be washed by rain from bare soils like those under observation as from soils protected under a relatively thin cover of leaf litter. The effect of the litter cover is to preserve absorptive soil conditions, greatly reducing the immediate run-off and retaining a large part of the water to be fed out more slowly. The effect of removing the protective cover from an entire watershed, judging from this small-scale experiment, would be to fill the stream channels with water and soil after a heavy rain, leaving the little water in the soil to feed the streams during a dry period and reducing the retentive capacity of the soil by removing its protective cover of litter.

That vegetative cover on range lands in the West has a profound effect upon run-off and erosion has similarly been shown as the result of an experiment started by the U. S. Forest Service on the Wasatch Plateau in Utah. In this experiment a 10-acre watershed has been studied since 1915 to determine the amount of the surface run-off and sediment removed. The vegetation on this watershed was maintained for five years at 16 per cent of a complete cover and was then allowed to increase to a 40 per cent cover. This increase in the vegetative cover reduced the surface run-off 64 per cent and the erosion 54 per cent. It was thus shown that a normal cover of herbaceous vegetation will reduce floods from heavy rainstorms in mountainous regions. It was also shown that the maintenance of a plant cover reduces the probability of the formation of gullies, and when these have already been formed on overgrazed eroded areas, the restoration of vegetation clogs, dams, and fills them. Thus it is indicated that proper range management will not only restore and maintain the maximum plant cover for

grazing purposes but will also insure adequate watershed protection except under very unfavorable circumstances.

In the Southern Appalachian hardwood forests the normal accumulation of leaf litter is very large, as shown by measurements made by the Appalachian Forest Experiment Station. The quantity of this material ranges from 9,000 to over 16,000 pounds per acre. This litter itself will hold a great deal of moisture, but a very much larger amount will be held by the soil underneath, as long as it is protected and kept porous and retentive by the surface cover of decaying leaves.

The three great problems which I have discussed—water supply, erosion, and flood control—reach to the very heart of our agricultural, industrial, and social life. They are so fundamental to the development of the Nation, so comprehensive and far-reaching, that they challenge attention. They are present in some form or other in every region and every community. They have been with us so long that they have become commonplace, and in spite of their gravity the tendency is to ignore them except when some great catastrophe, such as the Mississippi flood of 1927, forces them on our attention. Even then our efforts to solve them have not taken sufficiently into account the natural vegetative cover on the watersheds. Thorough investigation of what the watershed cover can and should contribute should not be delayed any longer. We need a comprehensive research program, national in its scope, that will sift out facts from surmise and give conclusive answers to all the questions that have been asked concerning the influences of the natural vegetative cover upon streamflow, erosion, and water supply.

To meet this need I have introduced in Congress a bill which will provide such a program. This program, if enacted, will determine to what extent forest and other natural vegetative cover on the watersheds

may be used as means of obtaining satisfactory conditions of waterflow and controlling erosion, and if so, whether it must be used in a virgin condition or may be modified by cutting or grazing. It will determine the influence of natural vegetative cover in conserving soil fertility and moisture for the growing of forest and forage crops, and in the delivery of maximum water supplies for irrigation, municipal use, power, navigation, and other purposes. It will cover the subjects of the stabilization of sand dunes, the conversion of waste to productive lands, protection against destructive floods, and the safeguarding of public and private works, investments in which already run into hundreds of millions of

dollars. It is designed to furnish facts and remedial measures relating to all these questions as a basis for action by federal, state, and other agencies.

The solution of these problems must of course take into account the great differences in conditions—topographic, soil, climatic, and in forest and range cover—that are to be found in the different parts of the continental area which constitutes the United States. These differences are fundamental and may lead to the formulation of widely varying measures, perhaps even policies, for the management of our forest and range and water resources. I believe that the Mississippi Valley Association can render a great national service if it will support such a program.

NOTE: Bill H. R. 4608 introduced by Congressman Leavitt, was referred to the Committee on Agriculture, and in turn to the Secretary of Agriculture for his opinion and report. The bill has been endorsed by the Society of American Foresters and independently by several of the Sections, and the American Forestry Association.—*Ed.*

AERIAL FOREST MAPPING¹

By STUART MOIR

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Many foresters have been intrigued by the possibilities of the airplane and aerial camera for making forest surveys and maps. The author, trained as a forester in America and Europe, has had much experience in developing the application of these new tools to forest work. He gives here his estimate of the possibilities and worth of aerial surveys. Particular advantages emphasized are high relative accuracy, speed in obtaining final results, and a 100 per cent coverage of the timbered area.

AVIATION has obtained a prominent position in forestry through the use of aircraft in the protection and appraisal of forest resources.

Today, when mail and passengers are carried by airplane on regular schedules both summer and winter, it is hard to realize that it is only during the past 12 years that aircraft has been used in forest work, and that the greatest advancement has been made in its use for such purposes during the past five years. Aircraft has demonstrated its value in many ways by the transportation of executives, engineers and emergency equipment, combating forest insect plagues and in land acquisition, but forest mapping is outstanding among the contributions of aviation to the forest industries. It combines the skill of the aviator and the photographer with the ability of the engineer.

DEVELOPMENT IN CANADA

Credit must be given to our Canadian friends for their enterprise and initiative in demonstrating the utility of aircraft and in developing its use for surveying and protecting timber areas. The outstanding pioneer in this development is Ellwood Wilson at Grande Mere, Canada, who proved in 1919 that planes could be used advantageously in mapping timber tracts and also to detect and combat for-

est fires. Eastern Canada was a particularly good proving ground for the development of methods of mapping and for the testing of various types of aircraft and photographic equipment to determine which were best suited to accomplish the work in hand. The rapid expansion of the paper industry in Canada during the early part of the 1920 decade contributed much to speed up the use of aircraft. There was an eager search for timber resources adequate to sustain mills under construction or contemplated, and airplanes were to a large extent relied upon to aid in procuring authentic information about the distribution, volume and quality of the available resources and a knowledge of the terrain essential to economical logging operation. Through the coöperation of several government departments in Canada methods of making aerial surveys have been developed which have made Canada foremost in this field.

DEVELOPMENT IN THE UNITED STATES

Aerial mapping for forestry purposes in the United States progressed less rapidly than in Canada, but has been carried on, particularly in recent years, over a more diversified type of country. It is safe to state that all of the major forest regions of the United States have had some aerial surveying done within their limits. In some regions these sur-

¹Presented at the 31st annual meeting of the Society of American Foresters at New Orleans, La., December 29-31, 1931.

veys have been of an experimental nature, while in others the mapping has been made as part of actual operations to satisfy the need for accurate information at a low cost in a short period of time. On the West Coast, particularly, good topographical maps have been made for the purpose of planning steam logging operations.

PROGRESS IN THE SOUTHERN UNITED STATES

In the South the development has been impeded somewhat due to the distressed condition of the lumber industry during the past few years, nevertheless extensive areas have been mapped which include hardwood and pine tracts and large areas in the Coastal Plains regions of the Carolinas. As the industry recovers during the next few years and dependable information is required concerning the location of available timber supplies to sustain paper mills or other wood-using industries which may be expected to come into the South, aerial maps will be relied upon to furnish this information so that operations may be conducted intelligently and at a low cost in face of a keen competitive market. The photographic map shows, as no other type of map can show, the exact topography of a region, and the volume and location of timber supplies. These maps are essential for business management as well as for the physical treatment of the forest.

The search for readily accessible resources in Mexico, Central and South America which can be cheaply operated and transported to the southern United States for manufacture has already begun. Aircraft is playing an important role in photographic mapping and reconnaissance of these areas in countries to the south of us.

Forest surveys from the air are conducted in four ways:

1. By airplane reconnaissance or observation.
2. By sketching.
3. By oblique photographs.
4. By vertical photographs.

AERIAL RECONNAISSANCE

Airplane reconnaissance may be employed to great advantage as a preliminary step to detail photographic mapping, because of the valuable assistance this preliminary cruise gives the observer in enabling him to plan the work to follow. This method is also frequently employed in making a regional survey to determine general characteristics of forest areas and to obtain information concerning the percentages of major types and a knowledge of topography and drainage conditions. Very frequently an observation trip over an extensive tract is necessary to determine the general characteristic of a territory for the purpose of acquiring sufficient amount of information on which to base a decision as to whether or not the area under consideration justifies purchase and further and more careful estimating. These observation trips are valuable also in checking cutting areas, hauling, driving and other phases of forest operations as well as for observing fires and checking acreage burned and the condition of the forest following fire.

AERIAL SKETCHING

Aerial sketching is of assistance as preliminary to ground mapping when good surface control exists and it is possible for an experienced and skilled plotter, perfectly at home in the air to sketch types, density of stands, burns and other prominent features within the boundaries of physical features indicated on the map. Sketching usually proceeds by blocks of area and not by parallel strips and is done from an altitude of from 3,000 feet to 5,000 feet above the ground.

The altitude of flight is governed by requirements of safety as well as the detail of information to be obtained. In unmapped territory sketching is difficult and inaccurate as to detail. However, the results are frequently satisfactory wherever low land values do not justify more accurate details at somewhat higher costs.

Photography furnishes a permanent, dependable and mathematically correct record of the ground conditions which can be studied at leisure for any purpose desired. The aerial camera has been spoken of as the instrument with the "chemical eye" and the "mechanical brain." Aerial photography is divided into two major classes—oblique photographs and vertical photographs.

OBLIQUE PHOTOGRAPHY

Oblique photographs are applicable to large areas where a fine degree of accuracy is not required and the ground is fairly level. It gives an excellent visual idea of the character of the forest. The photographs are taken with the camera axis at an angle with the ground and for purposes of mapping, the camera is tilted sufficiently from the vertical to include the horizon. Photography is carried on by a system of straight parallel strips, each of which starts and ends with photographs showing points whose position is known. This method is extensively used in Canada where grid systems, to take care of the perspective, have been worked out for various altitudes and different focal lengths of camera. These grids are sub-divided into sections ten chains square and when placed over the photographs make it possible to map the area accurately enough for most purposes. From these photographs it is possible to map both the topographical features and the forest types from one-half to 3 miles each side of the line of flight and prominent features at even greater distances.

VERTICAL PHOTOGRAPHY

Vertical photography is the method which has been most extensively employed in mapping areas in the South and is more accurate than the oblique system. The camera is mounted so that its points vertically through a hole in the bottom of the fuselage of the airplane. It may "click" off a photograph covering from one to six square miles every 200 seconds while the plane is traveling at a speed of 75 miles per hour, at an altitude of from 6,000 feet to 16,000 feet or even higher, above the ground, and the scale varies with the altitude and the focal length of the camera. The camera doing this work is a remarkable instrument for it has a shutter speed of $1/150$ of a second working across a diameter of 4 1/2 inches. It carries a roll of film 75 feet long, giving 100 exposures. When one roll is completely exposed the magazine may be replaced by another one already loaded in about one-quarter of a minute. Photographs are taken with a forward overlap of 60 per cent and a side overlap of from 20 per cent to 50 per cent according to the accuracy requirements of the map to be made from them.

MOSAIC MAP

A photographic map made by the assembly of photographs is termed "a mosaic map." Variation in the scale of the photographs is taken care of by mathematical correction, and the pictures are assembled by careful methods to make an accurate map. Sometimes the individual photographs are not assembled into a careful mosaic map, but are merely numbered for indexing and then roughly assembled so that physical features on over-lapping pictures will match. This entire rough assembly is then copied to make a photographic index map. Such a map serves as a guide in using the individual prints in the field and designates

the relationship of one photograph to another and to the entire area.

COMPUTATION OF VOLUME PER ACRE

Time does not permit a complete discussion of the details and methods of using the aerial survey for purposes of timber estimating. The purpose of this paper is to discuss the actual accomplishments and advantages of the aerial survey. Some ground work is of course necessary to determine quality, insect and disease damage, average heights and diameters of trees and a knowledge of soil and ground conditions necessary for logging operations or silvicultural studies. The amount of field work, however, is reduced by 75 per cent with a resulting economy in time and money, because the actual work in the field involves only checking, on the ground, of representative areas in each forest type which have been previously selected on the photographic map. Much loss of time is eliminated by discarding obviously unproductive areas. It is easy to compute the volume per acre for each type by using the volume of the average tree, which is obtained by field measurements. The number of trees per acre in each type can be actually counted on sample plots distributed throughout representative types apparent on the photographic map. Acreage is obtained by planimetry of the type areas.

VALUE OF STEREOSCOPIC STUDY

By going a step further and obtaining a set of overlapping photographs, so taken, that when viewed in pairs under the stereoscope, the ground is brought into relief, it is possible to make a good contour map with a small amount of available ground control. This contour method applies particularly to rough country.

The stereoscope is particularly useful in making a comprehensive study of the topography of a region and greatly facilitates road location, the selection of dam sites and camp sites, and the layout of a system of fire look-outs as well as aiding in silvicultural studies. It is indispensable in determining the comparative heights of trees and in assisting in the identification of species. Furthermore, many objects become identifiable which would otherwise remain meaningless.

As to time required—125 square miles can be mapped in one day with one plane; the photographs can be developed in 48 hours and the map made ready for use in two weeks. The combined costs of the aerial survey and field work should be about 15 per cent less than the cost of a timber cruise and map made entirely by ground methods with a distinct advantage in favor of the aerial survey because it covers 100 per cent of the area.

What progress aerial forest mapping will make in the South and throughout the rest of the country, in the next few years, only time can actually tell. The results obtained to date show clearly the possibilities of an even more extensive use of the airplane for forestry purposes. The engineering profession is today taking advantage of facilities offered by the airplane and the aerial camera and the forester too will learn to regard these instruments as new and powerful allies in the conduct of his work. With experience, the interpretation of aerial photographs is becoming more efficient and as skill increases in the reading of photographs of timbered areas the forester will consider the aerial survey as an essential tool in the execution of his business.

It may be safely stated that this type of survey furnishes a means of mapping ground and forest detail which is at once more accurate, cheaper and less time consuming than any other method of survey at present known to us.



BRIEFER ARTICLES AND NOTES



A BRIEF STUDY OF CONIFER NEEDLE OILS

The study of conifer needle oils, their yield, and flash point characteristics is a part of the general study being conducted by the Idaho School of Forestry on the subject of the utilization of forest materials. Although A. W. Schorger (The Conifer Leaf Oil Industry, Am. Lumb. 28: Apr. 29, 1916) has already given us some very useful data on many of our needle oils, it was necessary to test the yield of oils from fresh materials collected in the Idaho region in order to compare these results with the data previously recorded.

YIELD OF NEEDLE OILS

By means of a simple steam retort adapted from a discarded steam autoclave and a copper coil condensing unit, a series of runs was made using steam at atmospheric pressure and subjecting freshly harvested needles to these conditions. An automatic separator placed at the condenser outlet was devised for use in separating the oil from the water which condensed with it. The needles were carefully freed of twigs, bark or other extraneous material and in two of

the tests the needles were chopped up before introducing them into the steam retort. It was found that the chopping shortened the run somewhat. Table 1 gives a summary of these results, showing a high yield for western red cedar, lowland white fir, and Douglas fir and a low yield for western yellow, or ponderosa, pine, western white pine, and lodgepole pine. In general the yields are somewhat higher than those given by Schorger. The quality of the oils obtained appear to be of high grade. The most pleasing odors are found in the Douglas fir and ponderosa pine oils. These, it seems, could readily be used in scenting more expensive products such as soaps and other toilet articles.

No attempts have as yet been made to discover or develop uses for these oils. Some preliminary tests made with dilutions of western red cedar oil against chicken mites in poultry roosts and nests indicate that this oil has some useful insecticidal properties. Laboratory tests in which three drops of this oil, undiluted, were introduced into a two-quart jar containing large numbers of chicken mites showed death of the mites within 5½ hours.

Most of the conifer oils on the market

TABLE 1
YIELD OF CONIFER NEEDLE OILS OBTAINED BY STEAM DISTILLATION AT ATMOSPHERIC PRESSURE

Species	Scientific name	Yield of oil based on green weight	Month and year collected
		of needles. Per cent	
Western red cedar	<i>Thuja plicata</i>	0.9 to 1.3	Nov. to Dec., 1929
White fir	<i>Abies grandis</i>	0.7 to 0.95	Oct. to Dec., 1929
Douglas fir	<i>Pseudotsuga taxifolia</i>	0.7 to 1.2	Nov. to Dec., 1929
Western yellow pine	<i>Pinus ponderosa</i>	0.3 to 0.34	Oct., 1929
Western white pine	<i>Pinus monticola</i>	0.06 to 0.07	Nov., 1929
Lodgepole pine	<i>Pinus contorta</i>	0.015	Jan., 1930

day are used as a perfume in greases and shoe blackenings. They are also used in soaps, insecticides, liniments, and medicinal preparations. The attractive odor of these oils is due mainly to certain constituents such as borneol and borneol acetate. It is hoped that continued research may extend the uses for these oils and their products.

FLASH POINTS AND COMBUSTION DATA

No time was available in which to determine the specific gravity and principal constituents of these oils but a series of tests was conducted for the purpose of determining their flash points.

A flash point apparatus was constructed which conformed to the standard required for such tests and samples of each oil were tested for flash point and combustion point temperatures. The amount of oil consumed (in c. c.) during a combustion period of 1 minute was also recorded. The tip of a movable pilot flame, extending from a 0.03 inch orifice, was brought across the surface of the oil at a distance of one-quarter inch. The flash point was tested as the oil was heated and was again tested as it cooled. The

temperature of the oil at the combustion point or point when the flame established itself over the surface of the oil and the temperature at the end of 1 minute were also obtained. The results of these tests are given in Table 2.

The interesting fact, shown in Table 2, that all of the oils have a flash point considerably below the boiling point of water may throw some light on the high combustibility of green conifer crowns in the forest. Western red cedar oil shows the highest flash point at a temperature of from 75° to 80° C. and western white pine the lowest at 45° C.

E. E. HUBERT,

*In charge Forest Products Laboratory,
University of Idaho.*



THE RELATION BETWEEN LOCUST BORER DAMAGE AND SITE

Because of its durability and wide range of uses, black locust has found favor among foresters and farmers as a very desirable tree for planting purposes. It has been recommended for planting on almost any site, the assumption hav-

TABLE 2

RESULTS OF FLASH POINT AND COMBUSTION TESTS OF CERTAIN STEAM DISTILLED CONIFER NEEDLE OILS. (AVERAGES OF THREE TESTS EACH. TIP OF PILOT FLAME MOVED ABOVE SURFACE OF OIL AT $\frac{1}{4}$ ".) STANDARD FLAME ORIFICE IS BETWEEN .027 AND .031 INCH IN DIAMETER. ORIFICE USED IS .03 INCH IN DIAMETER. TEN C. C. OF OIL WERE USED IN EACH TEST

Kind of needle oil	Temperatures—degrees centigrade				Amount of oil consumed during pre-heating and combustion. (Combustion period—1 min.) c. c.	Relative rate of cooling of oil
	Start of test	Flash point	Combustion point	After combustion		
Western white pine.....	30	45	60	90	0.5	Fairly rapid
Western yellow pine No. 1....	31	48	55	95	1.2	Slowly
Western yellow pine No. 2....	30	50	55	92	1.1	Slowly
Douglas fir	35	48	60	90	1.1	Slowly
Douglas fir twigs and needles	31	45	55	105	1.3	Slowly
White fir No. 1.....	31	50	58	90	1.1	Slowly
White fir No. 2.....	35	50	55	87	1.1	Slowly
White fir No. 3.....	31	48	56	92	1.1	Slowly
Western red cedar No. 1.....	30	65	75	97	1.1	Rapidly
Western red cedar No. 2.....	32	70	80	100	1.2	Rapidly
Western red cedar No. 3.....	27	60	75	98	0.9	Rapidly
Pine oil						
(western yellow pine wood)	30	50	60	75	1.2	Slowly

ing been made that locust will grow on sites too poor for more exacting species of trees. This latter assumption has led to the planting of black locust on sites for which it was not suited and as a consequence a number of such plantations, all over the country, have proved worthless.

An investigation of the locust borer problem during the field season of 1931 by Dr. R. C. Hall, assistant entomologist of the Central States Forest Experiment Station, has brought to light some interesting facts with regard to the relationship of site to locust borer damage.

It was found quite universally in the Central States that locust growing on poor sites was invariably severely damaged by the locust borer regardless of other factors such as density of stems per acre, amount of shade, mixture, and others. It was found likewise that locust growing on good sites was rarely ever severely injured by the locust borer except in the case of weakened and suppressed trees in the stand.

While there appears to be a close relationship between site and locust borer damage, there are also other factors that show a relationship to locust borer damage. Two such factors are crown class and diameter of stem.

In general there appears to be a very definite relationship between crown class and locust borer damage. Dominant trees show least damage with co-dominant trees showing more than the dominant, intermediate more severely damaged than co-dominant, and suppressed trees most severely injured of all.

There appears to be an inverse relationship between locust borer damage and diameter of stem, the larger diameters showing least damage and the smaller showing the most damage. This relationship holds in any even-aged plantation over about ten years of age.

All the above relationships point to the

fact that vigorous, fast-growing locust is comparatively free from locust borer damage, while weakened, slow-growing trees are very likely to be severely injured.



THE CHAPARRAL CLUB

Mindful of the importance of public sentiment in the control of man-caused fires there was formed in 1931 in Los Angeles County, California, an organization to aid in the enlistment of the local women and children to support fire prevention work. Its form and its success to date may be suggestive to those interested in fire prevention in other regions.

The organization is known as The Chaparral Club and is essentially a nature-study group. Its formation was sponsored by the Conservation Association of the county and it is closely affiliated with the Los Angeles Chamber of Commerce. The Club also has the sponsorship and cooperation of Earle C. Anthony, Inc., owners and operators of radio stations KFI and KECA. The Club was "on the air" during the past season for 15 minutes each Friday morning with talks by naturalists enlisted from public agencies, schools and private life. The speakers are called Guides. George H. Cecil, formerly of the Forest Service, and a senior member of the Society, serves as Executive Secretary and Chief Guide. In some instances the inherent subject interest of the programs was intensified by dramatizing it as a trailside discussion of the problems of conservation. The scenes of these discussions were localized so that individual listeners could themselves repeat the theoretical journey taken by the club guides and recognize familiar plants, trees, and shrubs that were described.

Supplementing the radio talks, printed matter concerning conservation was mailed to whomsoever made application for it.

"Those who participated in the organi-

ization of the club saw clearly that it offered a broad field for important educational efforts, not so much for the dissemination of fire prevention propaganda as for the stimulation of interest in the natural things of Southern California which it is desired to protect from the ravages of fire. Once this interest is aroused, a part of the fire prevention goal has been gained, for most Southern California forest fires are caused by carelessness or heedlessness. Much lack of appreciation for the unusual vegetation of this area has been characteristic, chiefly on the part of new residents from the Middle West and East, who are accustomed to a more luxuriant flora, and the association decided that it might well draw attention to the peculiar beauties of the 'elfin forest,' or the chaparral.

"As a fire prevention measure, the organization of the Chaparral Club and the carrying out of its objectives has been an unusual step. That it has been successful is undoubtedly due to an awakening public interest in nature study and conservation."



PERCY GROOM PASSES AWAY

The *Empire Forestry Journal*, Vol. 10, No. 2, 1931, carried the announcement of the death of Professor Percy Groom, F.R.S., M.A., D.Sc., the botanical expert and authority on wood technology. Professor Groom, who was 66 years of age at the time of his death, held at one time the Professorship of Botany and Arboriculture at the Imperial College, Whampoa, China. In 1911 he became Professor of Technology of Woods and Fibres at the Imperial College, South Kensington. He wrote several books, mostly on wood technology, and was the author of numerous articles in technical journals.

FORESTRY CONGRESS AT NANCY

The International Union of the Institutes of Forestry Research will hold its next Congress at Nancy, France, September 4-11, 1932.

There will be excursions, before, during and after the Congress with the object of allowing its members to study the principal types of French forests and their methods of treatment.

The Congress will be divided into 6 sections:

1. Forest ecology and silviculture;
2. Forest utilization;
3. Tropical and Mediterranean forest problems;
4. Reafforestation and prevention of erosion in the mountains;
5. Pedological and climatological forestry;
6. Protection of the forests, divided into 3 subdivisions;
 - (a) Fire protection;
 - (b) Physiological and cryptogamic diseases of forest trees;
 - (c) Forest entomology.

According to the established custom, discussions will be led in German, English and French.

Excursions.—A survey of about ten days, will be arranged *before* the Congress; its object will be to give a general view of the principal forest regions of France. The program is as follows:

Meeting in Rouen about the 23rd August 1932.—Visit of a beech forest (Eawy), of Scotch pines (Roumare), Arboretum des Barres, maritime pine (near Bordeaux), Silver fir (in the district of Quillan—Aude), holme-oak, Aleppo-pine (district of Marseille), Larch and mountain-pine (district of Briancon).

Nancy will be reached the morning of September 4th.

2. *During* the Congress one or two excursions will be made in the immediate vicinity of Nancy.

3. *After the Congress.*—Three trips of about a week each will be organized at the same time in order to allow the members of the Congress to study more particularly a certain district or special types of the forests according to their own preference.

a. Vosges and Jura.—Beech forest in the Basses-Vosges; Darney. Silver fir: Gerardmer (Vosges), La Joux (Jura). Spruce forest: district of Pontarlier and, if possible, Annecy. (Haute-Savoie.)

b. Prevention of erosion in mountains.—Alpes.

Itinerary: Chambéry—St. Michel de Maurienne—St. Julien—La Grollaz—Le Galibier—Le Lautaret—Briançon—Montgenevre—Gap—Vallauria—Arc et Sigouste—Le Labouret.

c. Mediterranean District: Avignon—Mont Ventoux (Reafforestation in *Pinus nigra*, *Cedrus atlantica*) — Nîmes — Mont Aigoual (*Fagus sylvatica*, reafforestation in *Pinus halepensis*, *Quercus ilex*, *pubescens*)—Maures (*Pinus pinaster*, *Quercus suber*)—Nice (reafforestation).

Registration. Prospective visitors should register with the Union at once, addressing its president, Ph. Guinier, Directeur de l'Ecole Nationale des Eaux et Forêts, Nancy. Registration fee, to be paid before June 1, 1932, will be 150 francs. This fee covers the cost of field trips in and around Nancy. The excursion No. 1 will cost about 3,000 francs, and excursion No. 3 (a) 1,100; (b) 1,500, and (c) 1,500 francs.



THE HAMMER TEST FOR JUDGING SEEDS

The use of a hammer instead of a knife to make a quick empirical test of the soundness of seed possibly originated in the South. Mr. N. C. Canterbury, when assistant state forester of Louisiana, described it to me as in use at the state nursery at Woodworth, Louisiana, several years ago. It was new to me but it is so

simple that I imagine it must be used in other regions also.

In sowing seed in forest tree nurseries, of any size, germination tests are usually too complicated and long drawn out to be of much practical value; at least it is generally so considered in the South where the spring sowing from February to April follows so closely the seed extraction in November and December. I know of no nursery in Louisiana to use germination tests to any extent. The percentage of soundness is generally sufficient for determining the amount of seed to be sown.

In gathering and extracting seed for sale, tests should be made of the different lots to determine soundness. In the Long-Bell seed extraction plant at DeRidder tests of from 600 to 1,000 seed are made for every kiln charge. Most species must show 90 per cent or better soundness before the lots can be stored for sale. For this work the use of the hammer saves much time and the results obtained are more satisfactory than other methods.

To make the test the desired number of seed are counted—fifty or one hundred—spread out on a hard surface and each seed crushed with a light blow of a nail hammer, the tester keeping count as he crushes the seed, “one bad, two bad, three bad,” etc. Using a hammer is much easier and quicker than a knife for the usual cutting test. The condition of the kernel can be easily discerned as to whether it is plump, rich and oily, half filled and dried, or blind. The hammer test can be used on practically all tree seeds unless it is the small wafer-like seed of *Chamaecyparis*, *Sequoia* and similar species. For the smaller pine seeds, running 50,000 or more to the pound, the hammer has a great advantage over the knife since these small seeds are so awkward to hold while cutting.

A. D. READ,
DeRidder, Louisiana.



REVIEWS



Edited by Dr. Henry Schmitz, University of Minnesota, St. Paul, Minn.

Seeding and Planting in the Practice of Forestry. By James W. Toumey, Professor of Silviculture, Yale University, and Clarence F. Korstian, Director of Duke Forest and Professor of Silviculture, Duke University. *John Wiley & Sons, Inc., New York, 1931 Pp. 507, figures 162. Second edition \$5.00.*

The appearance of the second edition of Professor Toumey's book is timely, since within recent years there has been a rising tide of favor for reforestation of lands sub-marginal for agricultural use and on a very large scale by the states. The need of the application of technical knowledge is obvious lest the next generation curse this one in no uncertain terms for the results which will then reveal the skill of our present work or lack of it.

Dr. Korstian, the junior author, has ably brought this book up to date. In form the volume presents much the same guise as the first edition; in content it has increased despite the elimination of out-of-date material.

The basis, economic, silvical and silvicultural, covers eighty-four pages; nursery and planting practice fills the rest. The book purports to be for the guidance of forestry students, foresters, nurserymen, forest owners and farmers. Certainly any one of these classes may dip into the volume and find a wealth of useful as well as suggestive material. The book abounds in specific examples, methods and excellent illustrations. The italicized statement in the preface to the first edition, that the practitioner "must have a broad knowledge of methods and tools

in order that he may attain successful regeneration at the least cost," is assuredly borne out in the second edition. It includes a new chapter on planting survey and presents many new methods.

The test of any book on the art of forestry is use when information is desired for the solution of a particular problem. In this respect the subject index at the end of the volume points the way. The nurseryman can find tables, put into much better form than in the first edition, that give germinative capacity, purity per cent and number of seeds per pound, for example. Methods of seed collection and extraction may be studied to find the most recent modifications and improvements. Information on storage and treatment of seed is particularly good because of the definite statements given in numerous examples of various species under different conditions.

If one desires to rid a planting site of "small, obnoxious animals" the prescriptions for poisons are there, or if one wants a formula to determine the quantity of seed to sow in a nursery bed he may turn to the page indicated and find the formula reduced to words and not mystic letters as of yore.

I have tried to find some phase of forest nursery practice not treated in this book, but with no success. The only difficulty is to choose between methods of practice given in much detail.

The chapter on nursery diseases and insects should be helpful to nurserymen who have not had technical training, as it presents information briefly and clearly.

Planting methods and technique follow the manner of the first edition but bring

the material up to date. Of particular interest is the new reforestation machine of which an illustration and description appear.

As a textbook it presents so many methods without emphasis of any that the student may become confused. However, this full treatment has many advantages and the instructor can relate the basic principles to practice and the application of any method or methods to the regional or local problems under discussion, thus clarifying the matter in the student's mind.

From the standpoint of teacher and investigator the wealth of chapter references is excellent; evidence of the painstaking research of the junior author.

This volume will unquestionably hold its place as a standard text and reference book. It is well done.

The introductory chapter on the economic basis includes both historical statements and forest policy, but ignores discussion of economic returns in specific terms. It boosts planting but without listing both direct and indirect advantages. However, reforestation by planting, especially state planting, is on the increase for many reasons other than purely the future use of the products obtained and their local significance. "Seeding and Planting" has been a standard work since its first appearance and the second edition confirms the excellence of this publication, which should find wide use.

SAMUEL N. SPRING,
Cornell University.



Southern White Cedar. By C. F. Korstian and W. D. Brush. *U. S. Dept. of Agri. Technical Bulletin No. 251, September, 1931. 75 pages.*

No monograph on a single tree species has been issued by the Forest Service for quite a long time. This makes the recent

publication on southern white cedar doubly interesting for it not only tells the story of a remarkably interesting tree species but it also serves to indicate advances in silvicultural practice and thought and also in the technique of presentation.

The publication is the joint work of two authors, C. F. Korstian, who covers the silvicultural and botanical side of the matter in the first 35 pages of the bulletin, and W. D. Brush, who discusses the wood and its utilization in the last 16 pages.

The story which the bulletin tells is, in brief, that southern white cedar is the best crop for the white cedar swamps of the Atlantic seaboard where under good forest management a crop may be produced in from 50 to 70 years on good sites. In these cedar swamps the trees grow characteristically in dense, pure, even-aged stands, which, if they are to be reproduced by natural means should be clean cut in small enough units to permit the seed to come in from the side. Owing to the peculiar swamp terrain and the high degree to which utilization may be carried in most cases, this allows the development of a regular strip clear-cutting method in strips that range from 500 to 1,000 feet wide. The high degree of utilization also allows the thinning of the dense stands typical of this species, at least in regions where markets are best developed. The growing of this crop is demonstrated to be quite attractive from a financial standpoint. The variety of products to which the wood is adapted is very large and the prices received are high.

While a very wide departure from a certain stereotyped line of presentation is impossible in a monograph on a tree species, this publication shows a good deal of originality. It hangs together well and is solid, meaty, and concise. It does not have the usual holes that are frequently found in a publication of this kind. From reading the publication one

would judge that the field work was carried out with a publication of precisely this type in mind from the very first. The developments of modern forest mensuration have influenced the presentation all the way through but culminate in a very interesting series of tables including yield, stand, form, volume, etc., given in the appendix.

It is unfortunate that some of the plates, for example Plate 2 which is intended to show the character of the young reproduction and which, on this account, should bring out all possible detail, were printed upon the same grade of paper as the text of the bulletin. This detracts seriously from the forcefulness of these illustrations.

F. S. BAKER,
University of California.



Southern White Cedar. By C. F. Korstian and W. D. Brush. *U. S. Dept. of Agr. Technical Bulletin No. 251, September, 1931. 75 pages.*

This bulletin which has been awaited with interest is a very thorough and competent discussion of southern white cedar. Although not of great importance nationally, it is an important tree in the localities where it grows in commercial quantities. In some instances notably in the New Jersey Coastal Plain it is one of a few species of economic importance.

The tree has a wide geographical distribution along the Atlantic Seaboard. Its commercial importance is, however, confined to a few areas of heavy production scattered throughout its geographical range.

The species is especially exacting regarding its soil and soil moisture requirements and stands of southern white cedar are confined to swampy areas and stream banks where there is an abundance of soil moisture and an acid soil. The tree

is rarely found on uplands except as an ornamental. Although it is strictly a swamp tree it has been observed in New Jersey that the better stands are found on well-drained sites. Stands which are inundated part or all of the time often consist of a very inferior growth.

The tree on the best sites is tall, clean-barked with slight taper and a short conical crown. It grows with moderate rapidity, reaching its best development in the South Atlantic and Gulf states, and has much to commend it as a tree to be encouraged in forest management as the authors have shown in their discussion. Certain features of the growth, such as its pronounced tendency to grow in pure stands, the density of the stands and their even-aged character are desirable attributes from a silvicultural standpoint. Southern white cedar has numerous associates but they normally comprise a small proportion of the stand.

Reproduction is practically entirely from seed and is prolific as some seed is produced annually. The floor of a cedar swamp makes an ideal germination bed for seed stored in the duff or blown in following cutting. The determinations by Korstian on seed germination from a sample of cedar swamp peat show very interesting results.

The tree is comparatively free from injury, but fire, its worst enemy, when driven through a cedar swamp by a high wind usually results in the death of the stand. More often, however, cedar swamps act as a natural barrier to the progress of a fire. The damage from fungi is not serious and insect depredations in live timber are negligible. The tree is somewhat subject to windthrow and in the northern half of its range to damage by snow and ice storms.

Southern white cedar forms very dense stands especially during its early life. Korstian reports 30,000 seedlings to the acre on eight-year old cuttings. The number of trees per acre in mature stands

varies considerably with site. The yields are high running up to 71,500 board feet per acre on the best site at 100 years (International rule $\frac{1}{8}$ " kerf).

Southern white cedar grows on land which is useless for agriculture because of the slightly acid soil. In New Jersey and Massachusetts cut-over cedar swamp is often converted to cranberry bogs, but this industry apparently has reached the limit of expansion. Blueberry culture in recent years in New Jersey has resulted in the conversion of some cedar swamp for this purpose but expansion in this industry is likewise doubtful.

Southern white cedar readily lends itself to thinning but financially successful cuttings of this character are restricted to regions where a good market exists for specialized round products. Products removed must have a high unit value as thinning costs run about \$300 per acre. The points just mentioned have been well illustrated in New Jersey where extensive commercial thinnings have been carried on for a number of years. The clear-cutting method is universally employed in harvesting mature stands as natural regeneration is usually very complete. Clear-cutting in strips is sometimes used. Silviculturally, the chief disadvantage of the species lies in its very exacting site requirements which may limit its introduction artificially outside of its restricted commercial range. Some experimental plantations have been made in New Jersey but it is too early to predict definitely their success.

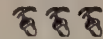
The wood has many qualities which make it suitable for a wide variety of uses. Its best known specialized use is for boat boards and it is used extensively along the Atlantic Coast for planking and decking on small craft. Other uses include lumber, lath, siding, shingles, boxes and crates. It is used for a considerable variety of post and pole products. The species would prove unsatisfactory, ex-

cept in a limited way, for general construction purposes, as the wood is light, weak and low in shock resistance.

From a utilization standpoint southern white cedar compares unfavorably with eastern red cedar where it is to be used for fence posts or rustic furniture. The latter wood is admittedly more durable and is preferred for various reasons by rustic furniture manufacturers. In certain well defined localities in the metropolitan areas of New York City and Philadelphia it is virtually impossible to dispose of a stick of southern white cedar in the round. Chestnut is also favored in various localities, especially for the construction of post and rail fence, which is used extensively in this region.

The data in the publication in tabular form are particularly complete and well presented. The bulletin is well illustrated with photographs and line drawings and should prove to be a helpful guide for the management of this species.

ALDEN T. COTTRELL,
*New Jersey Department of
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Slash Disposal in the Western Yellow Pine Forests of Oregon and Washington. By Thornton T. Munger and R. H. Westveld. *U. S. Dept. of Agri. Tech. Bull.* 259 Pp. 57, fig. 12, tables. 11, Sept., 1931.

This bulletin considers the slash disposal problem in the pine region of Washington and Oregon. This is a region of light rainfall, periodic droughts, high fire hazard, and other conditions inimical to the growth of forage, plants, and trees. The most profitable handling of much of this western yellow pine timber land is dependent on the methods used in disposing of the logging debris.

The authors describe the effect of seven methods of disposal on fire control and

the reestablishment of the stand. They compare these as to their effectiveness and practicability. No one method is considered by them as best under all conditions.

They advise the timber owner, whether private or public, to use that slash disposal method which will repay him the largest returns against losses from fire, and in increased prospects for future crops. They show convincingly that partial disposal with intensive protection is a method that has an important place in the silvicultural practice of the western yellow pine region. Similarly they show that broadcast burning and no disposal are detrimental to keeping cut-over lands in forest production. These conclusions are stated by the authors in part as follows:

"Flexibility should be the keynote in all slash-disposal plans; blanket rules should be avoided. The method adopted for any particular area should be selected because it fits the character of the timber, the topography, and the fire risk, and will accomplish the purpose for which it is intended at a minimum cost to the owner. The slash-disposal plan should be so flexible that the method may be varied or a combination of methods used, even within a single operation, to fit varying types of timber and hazards. . . .

"The slash disposal which necessitates as little handling and as little burning of slash as possible and yet results in a high degree of security from fire during and after logging gives the greatest total beneficial effects from the point of view of silviculture, fire control, and cost. Such a combination of advantages is perhaps more nearly attained by partial piling and burning with intensive protection than by any other method but it is not everywhere practicable, nor is it acceptable to all owners. . . .

"Broadcast burning is not to be recommended for either public or private owner under any conditions, unless the land is

to be devoted immediately to a higher use than forest growing, with which the trees would interfere. This method is wholly incompatible with continuous forest production. Neither has the negative method of no burning, implying that the area is given no special protection, any place in Oregon and Washington. The fire hazard is too great to leave large areas without burned fire lines or intensive protection. Such methods as can be recommended involve either great care in the major destruction of the slash, or intensive patrol of areas on which partial protection by slash destruction has been effected."

In general the bulletin emphasizes the principal that the best forestry is that which pays best in the long run.

It is clearly written and easily understood and it should be a good guide to private and public timber administrators to better their slash disposal practices in the western yellow pine type.

ERNEST L. KOLBE,

U. S. Forest Service, Portland, Ore.



Slash Disposal in the Western Yellow Pine Forests of Oregon and Washington. By Thornton T. Munger and R. H. Westveld. *U. S. Dept. of Agri. Tech. Bull.* 259 Pp. 57, fig. 12, tables 11, Sept., 1931.

The best disposal method of logging slash is one item that has occupied attention of foresters and loggers for many years. This bulletin discusses most of the methods that have been tried in this region and in the pine region of the Southwest. After a thorough description of each method a summary is introduced which points out the advantages and disadvantages of each method. From a study of this summary it will be seen that no one method is perfect nor is any one imperfect. The keynote of the entire question of brush disposal is summed up in the following paragraph from the bulletin: "Flexibility should be the keynote in

all slash-disposal plans; blanket rules should be avoided. The method adopted for any particular area should be selected because it fits the character of the timber, the topography, and the fire risk, and will accomplish the purpose for which it is intended at a minimum cost to the owner. The slash-disposal plan should be so flexible that the method may be varied or a combination of methods used, even within a single operation, to fit varying types of timber and hazards."

In reading this bulletin several questions arose in the mind of the reviewer. Pages 19-28. Can the expenditure of \$5.00 to \$10.00 be justified for slash disposal on land worth \$2.50 on the market? This is about the top price that the Forest Service is willing to pay for cut-over well stocked western yellow pine land. Even on federal land would it not be better to keep the \$5.00 to \$10.00 and take only a part of the interest and give intensive protection for a few years? The quite thorough protection now given this region costs usually not to exceed 5 cents per acre. Certainly the private owner will prefer to keep his money in the bank. The greatest hazard period for a cut-over area is immediately after logging. No method of disposal can reduce this hazard until the fall burning period after cutting, and eternal vigilance and protection must be practiced. After that combustibility diminishes, "The slash hazard in western yellow pine cuttings of the region is considered to have decreased materially after five years, still more after ten years, and after fifteen to twenty years to have practically disappeared."

Page 24. Is this statement in conformity with data gathered by the U. S. Forest Products Laboratory? "It sometimes happens, too, that the slash is too wet or too green to burn clean; the needles burn, but the twigs and branches are only charred and thereafter decay more slowly than if untouched by fire." The above noted laboratory states in effect that the

charring of fence posts is not advised and that the charring of a post decreases the life of the post by the amount of charring. Does not this principle apply to charred slash?

Under "spot burning" could not a discussion of what might be called "swamper piling" be in order? With proper coöperation of the logging superintendent and education of the swampers who handle a considerable quantity of slash, particularly in horse logging, can not a cheap and effective method be devised? By education of the swampers I mean that slash can be thrown *away* from reserved trees and reproduction thickets as well as toward them. These piles can be burned at a later date, and even though they amount to only one-third of the debris, will add materially to the fire-proofing of the area and at a cost of only a few cents per thousand.

Page 52. Under "Location of Pile" would it not be better and easier to reverse the "Stake method" and have the officer in charge of the sale designate the areas not to be piled?

Page 53. Does the discussion of the number of piles placed in the skidways quite tell the story? A brush piler selects as a site for his pile a place where there is a considerable quantity of slash already accumulated and upon which he can with a minimum of effort continue to build. Naturally these embryo piles are not located in skidways. To move any quantity of brush even ten feet would in the aggregate increase costs appreciably.

This bulletin, the result of several years' intensive investigation, deserves the careful study of everyone connected with slash-disposal in this or similar regions. The importance of giving adequate protection to the advance reproduction, as stressed by the authors, is one of the important factors to be considered on an area that is to remain in permanent forest production.

T. J. STARKER,
Oregon State College.



SOCIETY AFFAIRS

NOTICE TO CONTRIBUTORS

Prospective contributors are reminded that the JOURNAL OF FORESTRY is not published in June, July, August and September. Copy received after March 15th must be held over for the October or subsequent issues. Present indications point to a surplus of material for the April and May issues. Authors are asked also to read the Report of the Editor in this issue and be guided accordingly in preparing their manuscripts. Copy not in good order and without suggestions for a leader attached will be delayed or declined.

EMANUEL FRITZ,
Editor-in-Chief.



AMENDMENTS TO BY-LAWS

The following amendments to the by-laws were adopted by the Council at its meeting in New Orleans, December 28, 1931.

"In the case of candidates who did not graduate from forestry schools the qualifications for Junior and Senior Membership as prescribed in Article III, Sections 3 and 4 shall be interpreted to mean that credit shall be allowed for study in subjects preparatory to forestry which were pursued as college or ranger school courses.

ASSOCIATE MEMBERSHIP

"Candidates for Associate Membership shall be endorsed by at least *two* sections 'as having shown substantial interest in forestry and having participated in its advancement.' Section endorsement shall not be perfunctory on the request of another section but shall be based on knowledge of the applicant and his work."

HINE WRITES SOCIETY

Executive Secretary Reed read the following letter from former Executive Secretary W. R. Hine, at the annual meeting of the Society in New Orleans, December 29-31, 1931.

DEAR MR. REED:

Your letter of December 16 is received and I am more than pleased to send a message to the members of the Society. The task is not an easy one, however, for I have evaded any such efforts for the past twelve months. I must of necessity be brief.

I want to express my thanks for the many encouraging assurances and thoughtful courtesies that have been received since my illness became known. Letters, books, magazines, flowers, gifts and greetings, direct and by proxy, have poured in to my wife and me until they have almost made the illness seem worthwhile. I have not attempted to acknowledge these kindly efforts for reasons that you all understand and approve.

I am very happy to report that I am now definitely on my way to recovery. For six months after I entered the hospital, I appeared to be losing ground. Certainly I lost weight and strength. Since June, however, I have gained steadily. All indications of active tuberculosis such as elevated temperature, rapid pulse, etc., have gradually disappeared. My weight has increased 30 pounds, bringing me back to normal. I am still required to remain in bed but I feel as good as I have in years and I believe my body as a whole is in better shape than it has been for some time. It is now merely a matter of time.

I am convinced that my recovery is due in considerable measure to the financial aid and the thoughtful consideration given me by the Society of American Foresters and many of the individual members. The confidence displayed in my early and certain recovery carried me through the first and most difficult months. It was not until I had been through the worst and knew it that I suspected the seriousness of my condition as of last December. Had I been fully aware, recovery would have been far more difficult and perhaps less certain.

The past year has brought me what seemed to be a very great tragedy. It has also brought me a very happy experience in my association with my fellow men. I feel quite hopeless in my effort to express my appreciation for all that has been done for me. At the moment I can only say that the efforts to aid me have been highly successful and I am grateful.

Let me add a wish for a successful conference in New Orleans and a happy and prosperous New Year to each of you.

Very sincerely yours,
W. R. HINE.

The Society wired as follows:

Your message read to the Society of American Foresters at the Annual Meeting to-day. By unanimous resolution I am directed to extend to you, the Society's heartiest congratulations on your progress toward recovery. In due course we shall be glad to welcome you back to the ranks of active workers.



FIELD TRIP TO BOGALUSA

One of the most successful features of the 31st annual meeting at New Orleans was the all-day field trip on December 31st to Bogalusa. About 100 members and wives in twenty-five cars started out at 8:00 in the morning under almost perfect weather conditions, and the expert guidance of local foresters.

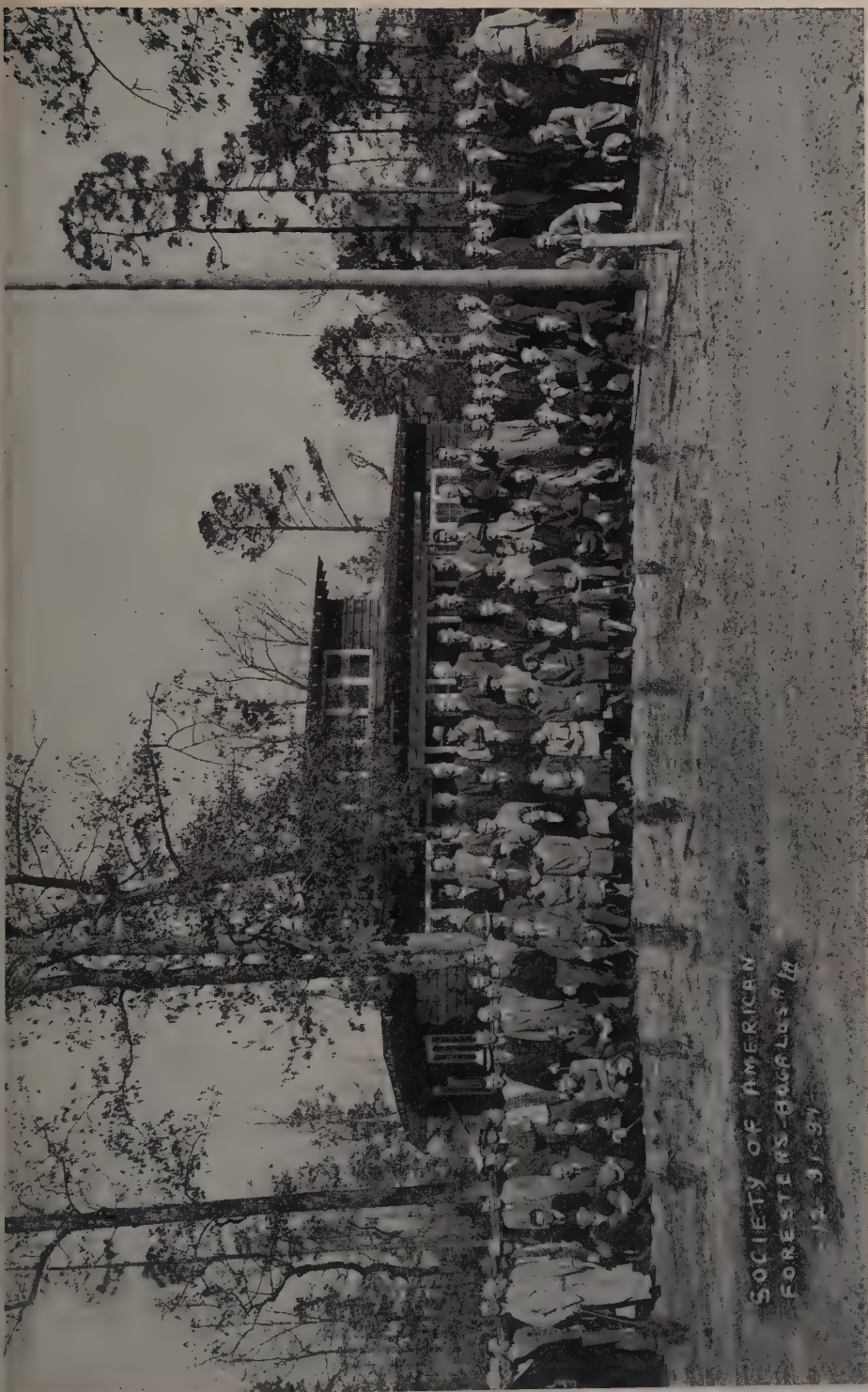
The caravan drove through the marshes northeast of New Orleans and the cut-over

and periodically burned pine lands of St. Tammany Parish for ninety miles. The side trips at Bogalusa totalled about forty miles additional before the ninety-mile return trip at night. The stops at Bogalusa included the saw mill of the Great Southern Lumber Company and the school forest and school camp buildings of the Louisiana State University Forest School. The main emphasis of the trip, however, was on the experimental and commercial application of silviculture on the ground.

The various stops made in the field fell naturally into five groups, the Great Southern Lumber Company's nursery and a demonstration planting of eleven-months-old nursery stock, experimental plantations of the Southern Forest Experiment Station, the Bureau of Plant Industry's studies of the brown-spot needle blight of longleaf pine, portions of 9,500 acres of eleven-year-old longleaf pine reproduced naturally in connection with commercial logging, and the more interesting and representative portions of the commercial plantations of the Great Southern Lumber Company.

At the time of the field trip, the Company's nursery contained half a million slash pine seedlings, eleven months old, grown from seed collected locally in 1929. The seedlings were spaced 15 to the running foot, in drills five feet long and 6 inches apart, running crosswise of the beds. The stock was of exceptional quality, 85 per cent or better being Grade 1 seedlings 12-15 inches high, with stiff, woody stems, abundant fascicled needles, and well-developed winter buds. Later an opportunity was given to see some of this stock planted directly in unfurrowed ground, on a site occupied by tall grass, by men working in pairs and using a ten-pound iron planting bar. Trees were set 6 x 8 feet, each pair of workers planting 2,000 or more in a ten-hour day.

The experimental plantations visited had been made seven growing seasons before,



SOCIETY OF AMERICAN
FORESTERS - AUGUST 1934

Members and guests of the Society of American Foresters, at the Louisiana State University Forest School Camp during the field trip to reforestation operations of the Great Southern Lumber Company.

with 1-0 stock. These particular plantations included a great many tests with longleaf, slash, and loblolly pines, but time permitted the emphasizing of only three points: the promising but remarkably varied height growth of planted longleaf (trees from 6 inches to 12 feet high 7 years in the field); the better growth of both slash and loblolly pines on the better drained portions of the area; and the remarkable superiority of slash and loblolly pines from Grade 1 as compared with Grade 2 nursery stock and of those from Grade 2 as compared with Grade 3.

The brown-spot studies conducted by Mr. P. V. Siggers of the Bureau of Plant Industry consisted of several rows in a three-year-old longleaf pine plantation, and of 120 small plots in an extremely dense stand of longleaf pine seedlings (200,000 to 300,000 per acre) from the 1920 seed crop. The outstanding result of the study was the better height growth and the markedly increased vigor of the seedlings protected from brown-spot needle blight for three and four years by various fungicidal sprays, as contrasted with unsprayed seedlings suffering the heavy infection characteristic of the locality. Plainly there is truth in the contention that the brown-spot needle blight, in areas of severe infection, is an important factor in the growth of young longleaf pine.

That the brown-spot does not inhibit the successful regeneration and vigorous growth of longleaf pine, and that neither complete fire protection, nor one burn, nor periodic burns, nor annual burning necessarily makes or mars young stands of this species, was indicated by various portions of a 9,500 acre tract seeded naturally in 1920 and part of it again in 1921. All portions had been burned over repeatedly until a year before the seed fell, and all had been protected while the seedlings were in the cotyledon stage. Here the similarity in fire histories ceased, but regardless of the number of burns

since establishment the whole area supported a magnificent stand of seedlings. Great differences in height growth there were, but traceable principally to differences in density, stands of 10,000 or more per acre making less growth, perhaps because of increased infection by brown-spot in dense stands. The best growth occurred in a tract of about 1,200 acres, unburned since the year before logging and seed fall, where the party drove for three miles past 11-year-old seedlings running 1,000 to 2,000 per acre, with the trees of the ultimate stand already from 10 to 20 feet high. This is unusually good growth for longleaf pine, which ordinarily makes no height growth at all the first five years. The main factor responsible for the good reproduction on the whole 9,500 acres was the abundant supply of seed from the virgin stand at or shortly before the time of cutting.

The most important commercial plantations visited were portions of the 7,000 acres of longleaf pine planted in 1928-29, of the 6,000 acres of slash pine planted in 1925-26, and the first commercial longleaf pine plantation ever made, so far as any records show. This last was established in 1923-24, and consisted of only 500 trees, but is of tremendous significance because it first demonstrated the feasibility of root-pruning longleaf pine seedlings, which develop 30-40 inch tap roots in 10 months in the nursery. Root-pruning at the time of lifting made available for planting the species particularly suitable for the vast areas of denuded longleaf pine lands. The trees in this plantation are now (8 years in the field and 9 from seed) from 10 to 15 feet high. Other plantations showed the inadvisability of trying to obtain artificial regeneration of the southern pines by direct seeding, except possibly slash pine on particularly favorable sites. Loblolly pine, now no longer planted by the Great Southern

Lumber Company, was shown to be too susceptible to tip moth injury, and too sensitive to adverse soil conditions, to be desirable for planting on typical longleaf pine sites. The last stop was made in the most impressive plantation of all, 700 acres of slash pine seven years in the field, and eight from seed, with a survival of better than 80 per cent and with trees 15 to 20 feet high.

Instructive and inspiring as were the things the foresters saw on this trip, their admiration was equally aroused by the consummate skill of Philip C. Wakeley, Associate Silviculturist of the Southern Forest Experiment Station, and his helpers in arranging the details of the trip and conducting it on schedule. Each member of the party was furnished with a mimeographed outline, cut to pocket size, describing the points of interest enroute and at each numbered stop. Large signs called attention to units in the great plantations. The outline itself represented a very large amount of work as well as a most intimate knowledge of the region and a nice perception of what was really significant. Stops were made frequently while traveling along the plantation roads for closer inspections and for explanatory talks led by Mr. Wakeley and Mr. Siggers.

It is safe to say that those who went on the field trip regarded it as in itself well worth the journey to the annual convention.



RESOLUTIONS

The following resolutions were adopted at the Society's Annual Meeting:

PUBLIC DOMAIN

WHEREAS, the facts known to the Society of American Foresters indicate that the conditions on the Public Domain will almost certainly require extensive remedial action if national welfare is to be

properly safeguarded and conserved; that there are many circumstances which militate against the probability that private initiative can or will take such action; that in the most acute situations the inevitable public action will be more effective if the lands involved are permanently under the control of the public agency responsible for the execution of the required remedial measures; and that in many instances that agency inevitably will be the Federal Government.

WHEREAS, with no public advantage except a temporary benefit of debatable value, the dispersal of the public domain, initially to the States, ultimately to private ownership, (therefore) would complicate and increase the cost and difficulty of the remedial measures which must be applied to these lands if our people are to retain their full opportunity for future life and expansion.

BE IT RESOLVED, that, in order to obtain conservation and rehabilitation of the soil, forage, wild life and watershed resources of the grazing ranges of the public domain these lands be organized into public ranges to be administered by Federal Government in a manner similar to and in coordination with the management of the National Forests, and

BE IT FURTHER RESOLVED, that, in recognition of the dependency of communities throughout the Rocky Mountain Regions and the Pacific Coastal Regions on nearby watersheds for their supply of water for irrigation and other purposes and that in many cases this dependence is interstate in scope, lands valuable for watershed protection be administered under the supervision of the Federal Government.

FEDERAL APPROPRIATIONS

WHEREAS, the seriousness of the present financial stress of the Federal Government will perforce necessitate temporary curtailment or deferment of many conservation activities,

BE IT RESOLVED, that the Society of American Foresters earnestly submits that the forestry appropriations involved must not be reduced below the minimum absolutely essential and that in case of protection activities no reduction of funds should be made.

NATIONAL CONFERENCE ON LAND UTILIZATION

BE IT RESOLVED, that the Society of American Foresters highly commends the Secretary of Agriculture, Mr. Arthur M. Hyde, for his initiation and execution of the National Conference on Land Utilization held in Chicago November 19-21st, 1931, and

BE IT FURTHER RESOLVED, that it commends also his appreciation and recognition and that of other members of the Conference of the important place that forestry has in our national problems of wisely planned land use, and

BE IT FURTHER RESOLVED, that the Society of American Foresters indorses in principal the conclusions reached and recommendations adopted by the National Conference on Land Utilization.

OUTLOOK SERVICE FOR FOREST PRODUCTS

WHEREAS, one of the outstanding needs of timberland owners, both large and small, is information on the market value of their products; and

WHEREAS, similar information is made available to other crop producers and to most manufacturers

BE IT RESOLVED, that the Society of American Foresters assembled in their 31st Annual Meeting requests the U. S. Forest Service and the Bureau of Agricultural Economics to cooperate with the Timber Conservation Board, the National Lumber Manufacturers Association, the Southern Pine Association, the Hardwood Manufacturers Institute, the American Pulp and Paper Association and other trade associations in collecting and publishing pe-

riodic reports on the market prices of forest products of all kinds.

GEORGE WASHINGTON BICENTENNIAL

WHEREAS, the Congress of the United States has created a commission to arrange a fitting nation-wide observance during 1932 of the 200th Anniversary of the birth of George Washington and

WHEREAS, the planting of memorial trees is one of the approved projects in celebrating this anniversary

BE IT RESOLVED, that the Society of American Foresters does hereby indorse the program of observance of the 200th anniversary of the birth of George Washington.

TIMBER CONSERVATION BOARD

WHEREAS, the Timber Conservation Board is seeking to insure the economic perpetuation of our forest resources and to assist in the more rapid adoption of forestry by private enterprise.

BE IT RESOLVED, that the Society of American Foresters is in hearty accord with those purposes and strongly urges the continuation of a board with similar functions upon a permanent basis.

FEDERAL INCOME TAX AS APPLIED TO FOREST PLANTING

WHEREAS, the Federal income tax regulation requires that planting and similar forestry costs incurred by wood using industries must be accounted for as capital investment thereby making it necessary to pay income tax on such expenditures when made out of current earnings and

WHEREAS, this necessitates carrying such costs as capital investment but without allowing a deduction for interest, thereby increasing the cost of growing timber, and

WHEREAS, at least one state having an income tax law permits planting and similar costs to be accounted for as operating costs of the current year, and

WHEREAS, this Society realizes that forestry must be an integral part of any permanent primary wood using industry

BE IT RESOLVED, that this Society urges the Bureau of Internal Revenue to reconsider its present interpretation and modify the regulations to permit forestry costs other than for land purchase to be accounted for as operating costs.

COMMENDING THE EDITOR

WHEREAS, Professor Emanuel Fritz has devoted a large amount of time in editing the JOURNAL OF FORESTRY and as a result has raised and maintained the editorial standards of the JOURNAL OF FORESTRY.

BE IT RESOLVED, that the Society of American Foresters in meeting assembled in New Orleans officially express its indebtedness to Professor Fritz for the material contribution he has made and is making to the JOURNAL OF FORESTRY.

COMMENDING CHAIRMAN OF COMMITTEE ON MEETINGS

WHEREAS, G. H. Lentz, Chairman, and other members of the entertainment committee have so ably arranged and managed the Annual Meeting of the Society of American Foresters.

WHEREAS, a most enjoyable and profitable meeting has been successfully concluded.

BE IT RESOLVED, that the Society of American Foresters hereby express their appreciation to this committee in a rising vote of thanks.

COMMENDING NEW ORLEANS DOCK BOARD

WHEREAS, the New Orleans Dock Board by furnishing the yacht "*Hugh McCloskey*" for harbor sight seeing trips on December 29th and 30th, added much to the pleasure of the annual meeting of the Society of American Foresters.

BE IT RESOLVED, that the Society of American Foresters express their thanks to the Dock Board and that the Secretary

be instructed to convey this appreciation in an appropriate letter.

COMMENDING NORTH PACIFIC SECTION

WHEREAS, the North Pacific Section of the Society of American Foresters furnished the Port Orford cedar veneer covers for the programs of the Annual Meeting.

BE IT RESOLVED, that the Society of American Foresters hereby express their thanks for this favor and that the Secretary be hereby instructed to transmit our appreciation in an appropriate letter.

COMMENDING PEARL RIVER LUMBER CO.

WHEREAS, the Pearl River Lumber Company furnished appropriate wooden paper weights as favors for the banquet at the Annual Meeting of the Society of American Foresters.

BE IT RESOLVED, that the Society of American Foresters hereby extends its thanks and that the Secretary hereby be instructed to transmit them to the Pearl River Lumber Company.

COMMENDING GREAT SOUTHERN LUMBER CO.

WHEREAS, the Great Southern Lumber Company acted as host on a field trip through the Company's mill and plantations; furnishing lunch and offering its personnel in making the trip instructive and interesting.

WHEREAS, the said Company furnished appropriate favors for the banquet and Kraft paper for the programs.

BE IT RESOLVED, that the Society of American Foresters hereby extends its thanks and appreciation to the Great Southern Lumber Company and that the Secretary hereby be instructed to transmit these to Mr. Cushing and Mr. J. K. Johnson and through them to their assistants.

COMMENDING ROGER SIMMONS AND AMERICAN PITCH PINE EXPORT ASSN.

WHEREAS, Mr. Roger Simmons, representing the American Pitch Pine Export Association, secured the Dock Board yacht "Hugh McCloskey" and made arrangements for the harbor sight-seeing trip.

WHEREAS, he was also instrumental in securing favors for the banquet and appropriate programs.

BE IT RESOLVED, that the Society of American Foresters hereby express their thanks to Mr. Simmons and his company, and instruct the Secretary to convey these appreciations in an appropriate letter.

E. O. SIECKE, *Chairman*,

W. F. BOND,

F. G. MILLER,

RESOLUTIONS COMMITTEE.



REPORT OF THE SECRETARY-TREASURER

Possibly the safest and most reliable report to make with respect to the year's financial business of the Society of American Foresters is to publish the audit of the Society's accounts as made by Mr. Frank A. Linzel, a Certified Public Accountant. This report is similar for comparative purposes, to the one made for 1930 which appears on pages 282 to 289 of the 1931 February issue of the JOURNAL. An examination of the auditor's report will disclose that the Society has progressed financially as well as might be expected in these years of economic depression. For example, it may be noted that the total income for the fiscal year ending November 30, 1931, totaled \$18,211.79 as compared with \$17,174.63 for the previous year, a gain of \$1,037.16, while expenditures for the same period amounted to \$16,919.29 or only \$15.17 more than was made in 1930. For further details as to income and expenditures for 1931 compared with those for 1930 the

reader is referred to "Exhibit B," of the audit. Under the caption "Invested Funds" the auditor states that the sale of bonds held for the Forest Education Survey resulted in a loss of \$449 during the year. This was loss in principal only for the interest earned on bonds of Forest Education Survey more than offset this loss. It was impracticable to avoid a loss in principal on those bonds that were sold during 1931 since it was expected that this special fund would be entirely expended and the Survey's accounts closed before the end of the fiscal year.

Mr. Linzel's audit and comments follow.

E. MORGAN PRYSE,
Secretary-Treasurer.



COMMENTS ON THE AUDIT FOR THE
FISCAL YEAR

CASH IN BANK

The Washington Loan & Trust Company has sent me direct Bank Statements for the Society, The Forest Education Survey and F. W. Reed Contingent Account for the month of November, 1931. The Balance of Cash shown by the Bank Statement for the Society has been reconciled and proves with the amount shown for the Society in the Balance Sheet. The Bank Balance for the Forest Education Survey is the exact amount shown in the Balance Sheet. The Bank Statement for F. W. Reed Contingent Account reflects a balance of \$246.61. An expense account is forthcoming from Mr. Reed covering the balance of \$3.39.

PETTY CASH
POST OFFICE DEPOSIT

The Impressed Petty Cash Fund in the office was counted and \$22.34 found to be on hand November 30, 1931. A deposit of \$10.75 is with the Post Office Department, required to cover possible deficiencies in JOURNAL Postage.

INVESTED FUNDS
INVESTMENTS FOR FOREST EDUCATION
SURVEY

The Securities were presented for my inspection by your Treasurer in the vaults of the Washington Loan & Trust Company. All coupons due thereon have been clipped and accounted for. Schedule "A" lists these securities, the par value and the cost thereof. The total cost agrees with the amount shown in the Balance Sheet. Due to present financial conditions, the aggregate market value is less than cost, however, the securities are of high standing.

During the year, certain of the bonds of the Society were sold at profit of \$107.50—certain other bonds were sold at a loss of \$62.50, resulting in a net profit of \$45.00 on bonds.

The sale of bonds held for the Forest Education Survey resulted in a loss of \$449.00 during the year.

JOURNALS IN STOCK
REPRINTS

At November 30, 1930, there was reported to be on hand 16,575 Journals valued at \$4,867.03. During the year eight copies were purchased for \$3.50. There were received from the printer during the year 1902 copies and from other sources at no cost 241 copies, making a grand total of 18,726 Journals. There were distributed free during the year 1,352 copies and 241 copies were sold for \$194.78, leaving on hand 17,133 copies. For the reason that the value ascribed to Journals is very slow of realization, such value has been deemed to be "Not Readily Realizable" and conservatism warrants the reducing of the value of the Journals by the amounts received from the sales thereof, for the time being. For that reason, the value of Journals has been credited with sales during the year in the amount of \$194.78, no adjustment has

been made for the increase in number of Journals during the year, thus showing a value of \$4,675.75 for the 17,133 Journals reported to be on hand at the close of the year.

With respect to Reprints, it appears to be the practice of the Society to bear one half of the cost of printing same. The result for the year is that the Society's portion of the cost of Reprints is \$206.42 and that amount has been closed into the cost of publishing the Journals during the year.

OFFICE EQUIPMENT

This account has increased \$95.00 for the purchase of additional equipment. Depreciation has been set aside thereon at 9 per cent totalling \$150.07, which amount is conservative.

PERMANENT SECRETARY FUND

As at November 30, 1930, there had been pledged for this fund a total of \$18,868.98 and \$10,880.02 had been collected. The proportion applied to the expense of the Permanent Secretary for 1930 was eight thirty-sixths (8/36) of the total pledged, equalling \$4,193.11 and the Society contributed \$1,468.08. The Balance in the account at the beginning of this fiscal year was \$6,686.91. There was collected during the year \$3,509.37, making a total of \$10,196.28. Amounts unpaid on pledges at November 30, 1931 were \$179 for 1930 and \$357.67 for 1931. For 1932, there is due on pledges \$3,739.92, making a total still to be collected of \$4,276.59 and the revision of total pledged to \$18,665.98.

The pledges being based on the operation of the Executive Secretary's office for three years, one-third of the revised total pledged, equalling \$6,221.99 has been applied to the expense of that office for this year.

It will be noted from the Income Statement that expenses allocated to the

COMPARATIVE BALANCE SHEETS NOVEMBER 30, 1930 AND NOVEMBER 30, 1931

ASSETS:	Year ended		Increase+ Decrease—
	November 30 1930	November 30 1931	
Cash in Bank	\$ 2,404.25	\$ 476.25	\$ 1,928.00—
Executive Secretary Contingent Fund	250.00	246.61	3.39—
Petty Cash Washington Office	22.34	22.34	
F. W. Reed		3.39	3.39+
C. G. Bates Petty Cash	3.08		3.08—
Post Office Deposit	10.75	10.75	
Invested Funds per Exhibit A 1	18,022.00	18,032.00	10.00+
Accounts Receivable	293.97	181.31	112.66—
Interest Receivable	199.77	206.34	6.57+
Journals in Stock ¹	4,867.03	4,675.75	191.28—
Office Furniture and Equipment	1,572.40	1,667.40	95.00+
Office Supplies on hand	131.62	115.00	16.62—
Cumulative Indexes on hand	416.40	211.20	205.20—
Society Pins on hand	100.80	148.50	47.70+
<i>Forest Education Survey</i>			
Cash in Bank	898.77	641.88	256.89—
Petty Cash	30.39	24.61	5.78—
Invested Funds per Exhibit A 1	12,075.00	1,930.00	10,145.00—
Interest Receivable	234.90	37.50	197.40—
Dr. C. H. Guise	39.73	244.15	204.42+
Office Furniture and Equipment	481.05	490.30	9.25+
Total Assets	\$42,054.25	\$29,365.28	\$12,688.97—
LIABILITIES AND NET WORTH:			
Accounts Payable	\$ 62.74	\$ —	\$ 62.74—
Membership Dues, next year		53.50	53.50+
Membership Dues, Advance	128.00	58.00	70.00—
Subscriptions, next year	41.54	156.19	114.65+
Permanent Secretary Fund	6,686.91	3,974.29	2,712.62—
Reserve for Forest Education Survey	13,759.84	3,368.44	10,391.40—
Reserve for Depreciation	336.51	486.58	150.07+
Reserve for Permanent Fund	2,990.00	2,990.00	
Reserve for Permanent Fund Interest	724.68	877.17	152.49+
Surplus per Exhibit B	17,324.03	17,401.11	77.08+
Total Liabilities and Net Worth	\$42,054.25	\$29,365.28	\$12,688.97—

¹The value ascribed to "Journals in Stock" is not readily realizable.

Washington, D. C.
December 7, 1931.

I have made an examination of the accounts and records of THE SOCIETY OF AMERICAN FORESTERS for the twelve month period ended November 30, 1931. The foregoing balance sheet, the accompanying income statements and comments, in my opinion, correctly set forth the financial condition and result of operation for the fiscal year ended November 30, 1931.

FRANK A. LINZEL,
Certified Public Accountant (N. Y.)

Executive Secretary were \$7,437.41, which comprises Salary, Travelling Expenses, Stenographer, portion of rent and telephone. After applying \$6,221.99 from the Executive Secretary's Fund, there was a balance of \$1,215.42 to be met by the Society and current earnings were sufficient so to do, it being unnecessary to delve into Surplus, as was done in 1930. The Society's contribution in actuality is considerably greater than \$1,215.45, due to the increased cost of operating, which has increased from \$13,429.66 for 1929 to \$16,904.12 for 1930 and \$16,919.29 for 1931. A direct comparison of expense attributable to the Executive Secretary is difficult for the reason that it has not fully functioned in 1930 or 1931.

INTEREST RECEIVABLE

This account represents interest earned on securities, but not collected at November 30, 1931.

CUMULATIVE INDEX—SOCIETY PINS OFFICE SUPPLIES

The balance in these accounts represents the cost of these items on hand at November 30, 1931. A profit was earned on cumulative indexes sold during the year, of \$98.26, also a profit of \$65.95 on society pins sold.

FOREST EDUCATION SURVEY

As will be noted from Exhibit "C", the amount expended during the year was \$10,661.42 and the net income from interest was \$270.02, leaving a total unexpended of \$3,368.44 of which total

\$490.30 represents office furniture and equipment.

RESERVE FOR PERMANENT FUND RESERVE FOR PERMANENT FUND INTEREST

The effect of these accounts is to specifically set apart from surplus the amounts standing to their credit. The reserve for permanent fund interest has been increased \$152.49 by a charge against income in accordance with the practice of the Society. In accordance with such practice, the average rate of interest earned on all investments is the basis for the credit. The average rate used is 5.1 per cent.

ADJUSTING JOURNAL ENTRIES

The journal entries necessary to adjust the accounts and close the records have been placed upon the records under my personal supervision, so that the records accord with the financial statements submitted.

SURPLUS

A net increase in surplus results from the year's operations in the amount of \$77.08.

ACCOUNTS AND RECORDS

The activities of the Society are constantly increasing and necessarily require more detail work on the books of records. Some new methods have been suggested and will be inaugurated in the new year, which should facilitate the keeping of same.

The books of record are ably kept and are in very good condition.

COMPARATIVE STATEMENT OF INCOME AND PROFIT AND LOSS
FISCAL YEARS ENDED NOVEMBER 30, 1930 AND NOVEMBER 30, 1931

	Year ended		
	November 30 1930	November 30 1931	Increase+ Decrease—
<i>Income:</i>			
Membership Dues Prior Years.....	\$ 419.34	\$ 375.50	\$ 43.84—
Membership Dues Current Year.....	11,891.96	12,766.18	874.22+
Journal Subscriptions Prior Years.....	4.00	161.62	157.62+
Journal Subscription Current Year.....	2,889.90	2,810.11	79.79—
Advertising.....	760.72	816.13	55.41+
Interest & Dividends earned.....	1,080.71	1,073.04	7.67—
Society Pins.....	13.35	65.95	52.60+
Cumulative Index.....	114.65	98.26	16.39—
Profit & Loss on Sale of Bonds (net).....		45.00	45.00+
GROSS INCOME	\$17,174.63	\$18,211.79	\$ 1,037.16+
<i>Deductions from Income:</i>			
Journal Expense.....	\$ 7,724.35	\$ 8,124.95	\$ 400.60+
Postage.....	620.03	637.74	17.71+
Miscellaneous Printing.....	603.00	312.15	290.85—
Editors Expense.....	34.88	176.49	141.61+
Contributions to other Societies.....	10.00		10.00—
Salaries & Wages.....	5,121.11	4,635.60	485.51—
Rent & Telephone.....	791.12	948.01	156.89+
General Expense.....	576.17	651.42	75.25+
Addressograph Expense.....	66.23	54.86	11.37—
Telegrams.....	129.84	87.86	41.98—
Commission & Exchange.....	14.45	13.45	1.00—
Travelling.....	180.92	25.78	155.14—
Office Supplies.....	317.96	227.15	90.81—
Depreciation on Office Equipment.....	141.52	150.07	8.55+
Multigraph & Mimeograph.....	251.04	165.08	85.96—
Annual Meeting Expense.....	73.51	222.80	149.29+
Cosmos Club Dinner.....	74.25		74.25—
Council Members Expense.....	21.25	4.85	16.40—
Permanent Fund Interest.....	152.49	152.49	
Report Committee on Industrial Forestry.....		93.75	93.75+
Report Committee on Forest Policy.....		234.79	234.79+
Deductions from Income	\$16,904.12	\$16,919.29	\$ 15.17+
Excess Income over Deductions	270.51	1,292.50	1,021.99+
Totals	\$17,174.63	\$18,211.79	\$ 1,037.16+
<i>Executive Secretary Expenses:</i>			
Salary, Stenographer, one third of Rent and other allocable expense.....	\$ 4,662.61	\$ 6,712.09	\$ 2,049.48+
Travel.....	998.58	725.32	273.26—
Totals	\$ 5,661.19	\$ 7,437.41	\$ 1,776.22+
Transferred from			
Permanent Secretary Fund.....	\$ 4,193.11	\$ 6,221.99	\$ 2,028.88+
Earnings Current Year.....	270.51	1,215.42	944.91+
Surplus.....	1,197.57		1,197.57—
	\$ 5,661.19	\$ 7,437.41	\$ 1,776.22+
<i>Reconciliation of Surplus:</i>			
Surplus November 30, 1930.....			\$17,324.03+
Earnings Fiscal Year 1931.....		\$ 1,444.99	
Less Amount to Executive Sec'y. Exp.....	\$ 1,215.42		
Less Amount to Permanent Fund Interest.....	\$ 152.49	1,367.91	
Balance Transferred to Surplus.....			77.08+
Surplus per Balance Sheet Nov. 30, 1931.....			\$17,401.11+

FOREST EDUCATION SURVEY
STATEMENT OF RECEIPTS AND DISBURSEMENTS
FISCAL YEAR ENDED NOVEMBER 30, 1931

Balance on Hand November 30, 1930.....		\$13,759.84
Interest Earned.....		232.52
Interest Accrued.....		37.50
Total.....		<u>\$14,029.86</u>
Disbursements.....		
Salaries.....	\$6,783.05	
Travel.....	1,761.97	
Operating Expense.....	1,547.19	
Supplies, Printing & Postage.....	120.21	
Loss on Sale of Bonds.....	449.00	
		<u>\$10,661.42</u>
Balance November 30, 1931.....		<u>\$ 3,368.44</u>
Balance Reflected as Follows:		
Cash in Bank.....	\$ 641.88	
Petty Cash.....	24.61	
Investment in Bonds per Schedule "A" 1.....	1,930.00	
Dr. C. H. Guise.....	244.15	
Interest Accrued.....	37.50	
Office Furniture & Equipment.....	490.30	
		<u>\$ 3,368.44</u>

Exhibit C.

THE SOCIETY OF AMERICAN FORESTERS
SCHEDULE OF SECURITIES

INVESTED FUNDS		Par Value	Cost
1	U. S. Gold Bond 4¼s Registered J. & D.....	\$ 500	\$ 500.00
5	U. S. Gold Bonds 4¼s 1952 A & O.....	500	500.00
1	Southern Pacific 4½s Gold 1968 M & S.....	1,000	1,003.75
1	Commonwealth of Australia 5% 1957 M & S.....	1,000	984.50
1	International Match S. F. 5% 1947 M & N.....	1,000	1,007.50
1	Mo. Pacific 1st Ref. 5% Gold 1977 M & S.....	1,000	1,013.75
1	Erie R. R. Ref. Imp. 5% 1967 M & N.....	1,000	982.50
2	Federal Land Bank (Houston) 4¼s J & J.....	2,000	2,055.00
1	Wheeling Steel Corporation 4½s Gold 1953 A & O.....	1,000	895.00
1	Penna. Co. 4¾ 1963 M & N.....	1,000	999.24
3	Mo. Pacific 4% Gold 1975 M & S.....	3,000	2,415.00
2	St. Louis & San Francisco 4½s 1978 Gold M & S.....	2,000	1,867.50
1	American & Foreign Power 5% 2030 M & S.....	1,000	880.00
2	Province of Ontario 4½s 1943 J & J.....	2,000	2,000.00
11	Shares Penn. R. R. Common Stock.....	550	820.26
7	Shares Penn Road Corporation.....	no	108.00
	Total Invested Funds.....		<u>\$18,032.00</u>
FOREST EDUCATION SURVEY INVESTMENTS			
Federal Land Bank Bonds			
2	St. Louis, Mo. 4½s 1933—1953 J & J.....	\$2,000	\$ 1,930.00
	Total Forest Education Survey Investment.....		<u>\$ 1,930.00</u>

Schedule A1.

REPORTS OF THE COMMITTEE ON INTERNATIONAL RELATIONS

The purpose of the Society's Committee on International Relations is to establish and maintain contacts with professional foresters of other countries that shall lead to better understanding and mutual benefit.

The committee functions by lending aid to foresters who are visiting the United States; by helping to secure information desired by members of this Society concerning forestry abroad, or by the officers of similarly organized societies of foresters of other nations, and by being on the alert to take advantage of opportunities that tend to advance the things for which foresters of all countries stand.

Apart from the courtesies extended by the Forest Service to visitors from overseas, particularly in Washington and at the Forest Products Laboratory, members of this committee have been glad, during this year, to welcome and give some aid to a number of foresters from Germany and France who were visiting the United States. Through correspondence with the officers of societies of foresters abroad the word has gone out that this committee stands ready to help such visitors to plan their itineraries and to meet the persons and to see the places in which they are most interested.

In several instances information has been furnished European foresters on matters about which they had made inquiry. A special case in point is a memorandum dealing with the policy of the U. S. Forest Service regarding the employment of foreign foresters, prepared by Mr. E. N. Munns, in response to a request from Poland. Exchanges of publications have been arranged in a few instances. Much more of this latter work could well be done, to the advantage of all concerned.

From the cordial tenor of the replies

received to the letters that have gone out it is evident that these offers on behalf of this Society are appreciated, as are the invitations that have been given to the foresters of other countries to send representatives to our annual meetings.

During 1931 a number of American foresters have been in Europe. From reports that have come back from them, and these men have been most cordially received everywhere and been made the recipients of many special courtesies. For the information of those members of the Society who are planning visits to Europe, it may be of interest to note that the Deutscher Forstverein in Germany and the Society of Polish Foresters in Poland have both offered to be of assistance to American foresters in much the same manner as has this Society. The officials with whom to get in touch are respectively, Dr. J. A. von Monroy, Deutscher Forstverein, Dessauerstrasse 260 III, Berlin, S. W. 11, Germany, and Engineer W. Baranski, Society of Polish Foresters, 36 Nowy-Swiat St., Warsaw, Poland. If he can be of service to members of the Society in planning visits to Europe the chairman of this Committee will be glad to render such aid as he may.

Without much question the most important happening during the past year in connection with the things for which this committee is working, was the appointment of Mr. Arthur C. Ringland to a semi-diplomatic post as representative of the Forest Service in Europe. Going to England in the late spring, Mr. Ringland attended the International Congress of Silviculture in France in July and has since then visited several of the other continental countries. He is securing and sending back to the Forest Service a variety of information and material concerning different aspects of forestry, of interest to American foresters, that can be secured to the best advantage only

through personal contacts. Plans are now under way to make at least a part of this material available to those interested. Some of it will appear in the JOURNAL OF FORESTRY.

In any new departure of this sort it takes some little time to establish relations and to get the work fully organized. With the progress that Mr. Ringland has already made, there is every reason to expect that this project will grow in importance and show more and more results as it is continued, and later expanded to include more of the European countries.

Mr. Ringland is a member of this committee. It is a part of his plan to be of service to individual American foresters, members of the Society, who desire information about special features of European forestry that cannot be obtained through the usual channels. In a letter written in November Mr. Ringland says, "I am hopeful that there will be many more specific questions sent me, so that I can direct inquiries to a definite purpose." Those wishing to avail themselves of this service should write direct to Mr. Arthur C. Ringland, Office of the Agricultural Attache, American Embassy, 6 Grosvenor Gardens, London, S. W. 1, England.

Although perhaps not strictly within the purview of this committee, it may nevertheless not be out of place here again to remind both the members of the Society and visiting foresters, that when in Washington they are not only at liberty, but are distinctly urged, to make use of the offices of the Society in the Hill Building, 839 17th Street, N. W. It is desired that these rooms serve as a common meeting ground for all those who are enrolled as members of the profession of forestry.

For the Committee,

R. S. HOSMER,

Chairman.

REPORT OF THE FOREST EDUCATION INQUIRY

The Forest Education Inquiry is completed. The report is written and will shortly be placed in the hands of the Advisory Committee for examination and criticism. After the comments of this committee have been received and digested, the report will be submitted to the officers of the Carnegie Corporation. If the report is approved steps will then be taken for its publication.

It is impossible to forecast how much time will be required for final approval of the report. This depends chiefly on the time occupied by the Advisory Committee in their examination of it. It would be inappropriate at this time to present the findings of those in charge of the Inquiry. Some comments on the character of the report may, however, be of interest.

The report is made up of five parts. In the first part, entitled the Background of Forest Education, the authors have endeavored to make clear the broad scope and the distinctive character of forestry. There is included also an outline of the history of forest education in the United States, and a statement of the present status of forestry. In short the aim has been to define the broad problem of forestry, the progress of education, and the task of the future.

The second part presents the results of the study of the occupations of forestry, the character of the activities involved in them, the educational background essential or desirable for each, the distribution of forest school graduates among the different occupations, and the trends in the opportunities for employment. There is included, further, the results of the study of financial rewards of professional work in forestry.

The third part of the report deals with the character and extent of education required in forestry. A distinction is made between the requirements of professional preparation and semi-professional and vocational training. There is discussed at some length the principles which it is believed should underlie professional education in forestry, the standards that should be striven for, and the problem of the length of time that should be devoted to preparation by the student. The subjects of instruction are discussed in some detail and the problem of field work given special attention. There are presented, further, the principles of building forest school curricula, with definite suggestions for the arrangement of plans of study in preparation for the general practice of forestry, for research, and for specialization in various aspects of applied forestry.

It was planned at first to discuss in considerable detail the content of the courses of instruction, especially in the subjects which have not as yet become at all standardized, as, for example, forest economics, forest policy, and forest administration. It has been decided to limit the descriptions of the field of study to what was deemed absolutely essential, and to present the more detailed matter in the form of mimeographed statements which will be circulated among the schools with a view to drawing out the opinions of different teachers, based on their experience, as to the content of various courses and the methods of instruction. Symposia derived in this way should be very helpful to the teachers in all schools.

Part III embraces also a full discussion of semi-professional and vocational training in forestry, including the principles and practices followed abroad.

The fourth part of the report deals with the special problems of the schools, including a discussion of educational

policy and organization, the problems and activities of the staff, matters relating to student enrollment, eliminations, and student guidance, problems of graduate study, forest school finances, educational facilities, etc. A large amount of factual material is included in this section of the report regarding the forest schools and their development and various elements of educational weakness pointed out. The attempt has been made to establish certain standards which it is believed should constitute an objective of the schools, and specific information is presented regarding the degree to which the several schools have attained these standards.

The next or fifth part of the report covers the results of the study of forest education in European countries, based chiefly on the personal survey made by Mr. Guise, together with such material as was gathered by the writer in 1926 and subsequently.

A bibliography of literature relating to forest education has been prepared. A selection of the more important items will be included as an appendix to the report.

The report deals primarily with forest education in the United States. A certain amount of information has been included about the problems in Canada. It was found, however, that a full study of forest education in Canada would require greater resources than those available and would considerably delay the completion of the report.

It is hoped that the information that has been assembled and the conclusions reached may benefit the forest schools and thereby strengthen the profession.

HENRY S. GRAVES,

Director.

REPORT OF THE FOREST POLICY COMMITTEE

In the absence of Mr. Barrington Moore, chairman of the Committee, a report was presented by Executive Secretary Franklin Reed.

The Forest Policy Committee, after two years of earnest effort, consultation with all possible individual members of the Society with whom we could get in contact, with the several Sections and with the Council, finally last spring completed a statement of "Principles of Forest Policy for the United States." This statement, containing nine main principles, was submitted to the membership as a whole for its vote. The results of the ballot were published in the October 1931 issue of the JOURNAL. The very strong majority in favor of the adoption of every one of the nine principles and their subdivisions, now calls, in the judgment of the committee, for a definite program of Society action.

The committee has felt that it would be inadvisable to try to develop a complete program based on all principles, but greater progress would be made by selecting a few of the more important ones first and concentrating upon them. The committee therefore has recommended that it be discharged, since its labors have been completed and that four separate committees be appointed by the Council to prepare and put into action a program, one committee for each of the following.

1. Fire Control
Principle IV, subdivision 1
2. Public Domain
Principle V, subdivision 1c
3. Public Forests and Protective Zones
Principles V and VI
4. Committee on Stabilization of Forest Industries
Principle IV, subdivision 4

These recommendations are now before the Council for action.

REPORT OF THE EDITOR

During 1931, the JOURNAL OF FORESTRY completed its 29th volume. It contains 1,250 pages in 8 numbers and includes 131 tables, 15 line cuts, 34 graphs, and 65 half tones. In order to use up available material before the June-to-September lull in publication, the April and May issues were expanded above the average size. The inclusion of more tabular material and illustrations than has been feasible in the past, has won universal favor. It is now possible to accept many excellent articles which heretofore had to be declined or else printed without such explanatory matter and consequently at the expense of clarity and significance. It is hoped that finances will continue to permit the acceptance of illustrated articles.

Practically every major phase of forestry is represented in the subject matter of Volume 29. However, the relative representation of the fields is not in accord with their relative importance. Some are emphasized heavily and specifically, others only generally and too lightly and some not at all. This may be interpreted, though erroneously, to reflect the division of interests of the members of the Society who, with some few exceptions, are the only contributors. It does indicate, however, that some groups are markedly more prolific, though not necessarily better writers than others. The group in private employ is the highest contributor, as might be expected because of its smaller size, and possibly also because some members of this group feel that the JOURNAL is purely an academic or scientific organ. Inasmuch as this group is growing in number and in experience, and has unique opportunities to study and attempt the solution of problems confronting private forestry, it is urged to share its knowledge with others. Forest protection, administration, and economics also, should

be better represented. Articles on silviculture naturally outnumber those in other departments. It would appear that the scientific side of forestry is running too far ahead of our ability to put it into practice. Articles are needed to show the practitioner how scientific results may be applied.

The JOURNAL should be looked upon for the present as a composite magazine serving at the same time the scientist, the academician and the practitioner. Furthermore, until it is feasible to have separate journals on silviculture, protection, utilization, or others, the JOURNAL OF FORESTRY must cover all departments of forestry.

A promising start has been made in obtaining publicity for JOURNAL articles through agencies as *Science News Service* and others. This would be beneficial as well to the profession of forestry as to the JOURNAL. Interest in the "Correspondence" department is growing. This department was inaugurated with the January 1931 issue in order to give readers an opportunity to discuss articles that have appeared in the JOURNAL and to serve as a "safety valve" for the expression of other opinions. The "Briefer Articles and Notes" department continues to be the most popular, as well as the most difficult department to prepare. Original notes on details of methods, practices or of equipment used in forestry, are particularly desired. Occasional forestry and allied notes, released by various public and private organizations, are given space here when they appear to be of interest to a rather large number of readers and when it is felt they would not otherwise come to the attention of members of the Society.

The quality of manuscripts submitted for publication continues to improve and their number is increasing. However, publication is still to a great extent on a hand-to-mouth basis, and there are still

too many contributions that require an inordinate amount of preparation by the editor. The editorial staff is a distinct aid to the editor in alleviating this situation, but due to the month-to-month difficulty in approaching some balance as to subject matter in the JOURNAL, there is not always time to submit manuscripts to an associate editor, and the editing must be done by the editor-in-chief. Whenever it is possible or desirable, however, manuscripts are submitted to a member of the staff for comment, approval and editing. Authors can lighten the labor of editing materially if they will observe the suggestions to contributors in the April 1931 issue, page 634. Scientific authors are urged to refrain from verbosity and the recitation of wearisome and needless detail. Greater conciseness and directness makes scientific contributions of immeasurably greater interest and worth. Authors of technical or practical articles on the other hand frequently omit essential details necessary for clarity. It is the editor's policy not only to publish valuable contributions to the knowledge of forestry, be they scientific, academic, technical or practical, but also to guard the standard of the style set for their presentation. Contributors should remember that the editor's services are entirely gratuitous and that any unnecessary burden of revision and editing requires extra time which must be taken from regular duties. Now that the number of contributions is increasing and there is thus more choice of material, manuscripts that are not in good style or order may be declined. The JOURNAL OF FORESTRY already holds a high place among American and foreign professional journals, a position that must be protected. As the competition increases it should be considered a distinction when a manuscript is accepted.

During the past year a single change was made on the editorial staff. Professor Geo. W. Peavy succeeded Professor

B. P. Kirkland in the department of protection and administration. With the October issue the paper of the JOURNAL was changed from a bulky antique book paper to an English finish stock. This change reduces the bulk of the magazine materially—an important item in binding—and it also saves the extra expense of tipping in a special paper when cuts are called for, although this saving is offset somewhat by the higher cost of the paper.

The printer continues to be the Monumental Printing Company of Baltimore, Md. The interest shown in the JOURNAL by this company, and the quality of its work is a source of satisfaction. Some additional advertising was received during the year, largely through the energetic efforts of Miss L. A. Warren, in her capacity as business manager. More advertising and a larger subscription list are urgent needs, if only to provide needed additions to the printing funds for JOURNAL improvement and enlargement. The editor feels that the JOURNAL should have a considerably larger field of readers than members of the Society. Its contents are of varied interest and the articles carry weight as a result of the experience and study of their authors and the JOURNAL. A larger clientele is particularly to be desired among the forest land owners and users. Many of the articles are particularly helpful to this class. There exists a feeling among some lumbermen that the JOURNAL is antagonistic to their interests. This, of course, is not true and while occasionally there appears an article violently opposed to the viewpoints of the lumber industry there also appear from time to time some that are exceedingly critical of the foresters' own ideas. It is the editor's policy to recognize and to present, whenever possible, opposing viewpoints when doing so may lead to better understanding.

In conclusion the editor wishes again

to express his gratitude for the helpful interest shown in the JOURNAL by a growing number of members of the Society, and especially to Miss L. A. Warren, the Society's business manager, for her aggressive and energetic personal interest in looking after publication matters, proof-reading and many other business details.

EMANUEL FRITZ,

Editor-in-Chief.



REPORT OF THE EXECUTIVE SECRETARY

Executive Secretary Franklin Reed read a letter of greeting from former Executive Secretary, W. R. Hine. The meeting, by unanimous vote, directed Mr. Reed to send Mr. Hine a telegram congratulating him upon the improvement of his health and wishing him early and complete recovery so that he would soon be back in the ranks of active forest workers. This was done.

In reporting on his own activities, Reed referred to the fact that a report is made to the Society monthly on the activities of the Executive Secretary's office in the Society Affairs sections of the JOURNAL under the heading, "Doings of the Executive Secretary." This report will be continued.

In discussing the work ahead, Mr. Reed laid emphasis on the growing prestige and influence of the Society in forestry affairs and on the steadily increasing tendency on the part of other forestry organizations and individuals interested in forestry matters, to look to the Society for professional leadership and advice. This is a responsibility, Mr. Reed brought out, that the Society must redeem and in redeeming it the Society will continually add to its own prestige and standing, which, in turn, will automatically extend to its members. Mr. Reed went on to say that in his judgment the time has come when a professional forester can no longer ask whether it would pay him to become

a member of the Society of American Foresters—the question rather is, if one expects to follow a professional forestry career, whether he can afford *not* to be a member of the Society. By way of illustration, Mr. Reed referred to the fact that the Timber Conservation Board, when it was being organized, recognized the indispensable need of the active support and coöperation of the Society, and the Society's president was therefore called upon to serve as a member of the Board itself. The coöperative assistance of the Executive Secretary to the Secretary of the Timber Board was insisted upon and the Advisory Committee of the Timber Board numbers among its members some nine professional foresters who are members of the Society. He referred also to the special invitation of Secretary Hyde to President Redington that the Society participate in the National Conference on Land Utilization, at which Executive Secretary Reed represented the Society and served on the Committee on Conclusions and Recommendations.

The personal contact with the several sections by attendance at their meetings and by assisting their officers in the work of the sections; maintenance of close contact and interchange of ideas between the members of the Council by correspondence and by personal contact with the Executive Secretary, is all tending, Mr. Reed explained, to knit the Society together in a manner to continually increase its influence and usefulness in the advancement of forestry and also to its own membership. Moreover, the contact by correspondence and by attendance at the meetings of other forestry and conservation organizations having interests in common with those of the Society, a contact which is possible only through having an Executive Secretary on the job, immeasurably increases the Society's opportunity for usefulness and progressive accomplishment in the right direction.

REPORT OF BUSINESS MANAGER

This report deals only with that portion of Society business which concerns financing. I shall give you here only the high spots of the Society's activities as reflected in the auditor's report for the fiscal year ending November 30, 1931 and tell you something of the budget for 1932, approved by the Finance Committee and subsequently by the Council.

The total expenditures or expense of the Society (exclusive of the Executive Secretary expense, with which I shall deal later) for the fiscal year 1931, were \$16,919.29—only \$15.17 more than 1930. The largest item was \$8,125 for printing and mailing the JOURNAL OF FORESTRY. The remaining \$8,794 was expended for salaries, postage, miscellaneous printing, editor's expense, rent, telephone and telegrams, multigraphing and mimeographing, office supplies, annual meeting expense, and other general expense. Compared with the volume of work handled during the past year this expenditure figure represents an exceedingly low operating cost, made possible only through a rigid control of the Society's finances.

Right here, may I say that the members can aid materially in further reducing the cost of operation by promptly paying their dues, which will result in fewer follow-up bills and letters and a corresponding saving in postage and time.

The total income for 1931 was \$18,211.79—an increase of \$1,037.16 over 1930, which we believe to be, in this time of depression, a worthwhile showing. Our two main sources of income are membership dues and subscriptions, although we receive some revenue from advertising in the JOURNAL OF FORESTRY and interest on Society investments and a small profit on the sale of pins and the cumulated index. It is anticipated that 1932 will show a marked increase in advertising revenue. To date more advertising is scheduled for 1932 than has

been earned in any previous year and about 50 per cent of the amount scheduled is new business.

Members of the Society can aid in increasing the Society's income by boosting the JOURNAL as an advertising medium and stimulating subscriptions.

It is significant that the income has increased from \$16,716.38 in 1929 to \$18,211.79 in 1931 and the membership from 1,624 in 1929 to 1,927 in 1931.

The budget for 1932 is based on total expenditures of \$17,117 and the income estimated at \$19,750 providing for net earnings (or surplus) of \$2,633.

Now about the Executive Secretary Fund. Prior to the employment of an Executive Secretary, the Council estimated that \$10,000 a year would be needed to carry on the work of that office. The estimate included salaries, travel and general expense such as rent, telephone, etc. Pledges were solicited from the members on a three-year basis. The amount subscribed totalled \$18,665.98 and the Society was to contribute the remaining \$11,334.00. Of the amount pledged, \$14,389.39 have been collected. There remains unpaid \$4,276.50 of which \$536 was due during 1930 and 1931 and \$3,739 payable during 1932.

The total expense of that office, as indicated by the auditor's report has been \$13,098.60. A truer figure is nearer \$10,000 a year (as estimated) and is reflected in increased overhead. This is a direct contribution from Society funds. You will recall that at the time the employment of an Executive Secretary was considered, it was thought that some portion of surplus would be used each year. We did draw upon surplus last year to the amount of \$1,197.57. It was *not* necessary to do so this year, nor do we expect to draw upon surplus next year. As a matter of fact, \$77.08 was added to surplus for 1931—a small sum, to be sure, but nevertheless a significant one.

A budget of \$10,000 for the Executive Secretary's office for 1932 has been ap-

proved by the Finance Committee and Council.

Every effort is being made to increase the Society's revenue so that the Executive Secretary's office may be provided for from the regular income of the Society. It can be done—and very simply by increasing membership in the Society. A fairly recent survey indicates that 70 per cent of the forest school graduates are not members of the Society. Unquestionably, many are eligible. The members and Sections can help greatly by bringing to the attention of non-members qualified for membership the many advantages of affiliating with their professional Society.

L. A. WARREN,
Business Manager.



SECRETARY-TREASURER APPOINTED

Mr. Paul G. Redington, formerly president of the Society, has been appointed Secretary-Treasurer, in accordance with the Constitution which provides that "The Secretary-Treasurer shall be appointed by the President, with the approval of the Council from among the members of the Council."

The duties of this office require that the Secretary-Treasurer work closely with Society's headquarters. For this reason it is highly desirable that he be a resident of Washington. As the only member of the Council, other than President Granger, residing in Washington, Mr. Redington offered his services, provided that he would be relieved of routine duties. This provision was acceptable and the Council authorized the appointment of Mr. W. N. Sparhawk as Deputy Secretary-Treasurer.



PERSONALS

John C. DeCamp, on leave from the forestry department of Michigan State College, has been appointed director of for-

Conducted Tour for AMERICAN FORESTERS

to the Forests of

Germany, Switzerland
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Aubrey H. MacAndrews, of the department of forest entomology, New York State College of Forestry, has been promoted to an assistant professorship and is now in charge of the department

J. Lee Deen, who received the M. F. and Ph. D. degrees from Yale University in 1929 and 1931, respectively, is now an instructor in silviculture in the Yale School of Forestry.

Allen W. Goodspeed, for the past two years forester for the Litchfield Forestry Association, Litchfield County, Conn., has been made instructor in applied forestry in the Yale School of Forestry.

Ellwood Wilson, forester for the Laurentide Paper Company of Quebec, has been appointed to fill the position left vacant by the resignation of Professor Samuel N. Spring, who goes to the New York State College of Forestry at Syracuse University.

Mr. Wilson started the first commercial reforestation in Canada, the first cooperative fire protective association, and was the first to use airplanes for fire protection and for forest mapping. He founded the Laurentide Air Service and Fairchild Aviation, Ltd.

From 1905 to 1931 he has been manager of the forestry division of the Laurentide Company of Grande Mere, Quebec, now a part of the Canadian Power and Paper Company, in charge of mapping, cruising, and reforestation.

ANNOUNCEMENT OF CANDIDATES FOR MEMBERSHIP

The following names of candidates for membership are referred to Junior Members, Senior Members and Fellows for comment or protest. The list includes all nominations received since the publication of the list in the February JOURNAL, without question as to eligibility; the names have not been passed upon by the Council. Important information regarding the qualifications of any candidate, which will enable the Council to take final action with a knowledge of essential facts, should be submitted to the undersigned before April 15, 1932. Statements on different men should be submitted on different sheets. Communications relating to candidates are considered by the Council as strictly confidential.

FOR ELECTION TO GRADE OF JUNIOR MEMBER

<i>Name and Education</i>	<i>Title and Address</i>	<i>Proposed by</i>
Bramhall, Albert W. Grade School & High School, Two Years.	District Forest Ranger, Modoc National Forest, Calif.	California Section
Brenneis, Andrew G. Penna. State College, School, 2 yrs., '28; University of California, Forestry School, '30.	Forest Ranger, U. S. F. Service, Susanville, Calif.	California Section
Brokenshire, W. J. San Jose High School; 1 yr. University of Washington.	District Ranger, Mineral, Calif.	California Section
Burkett, Luther B. Iowa State College, Ames, B. S., Forestry, June, 1930.	Assistant Ranger, Mineral District Lassen N. F., Mineral, Calif.	California Section
Burr, Maurice H. Univ. of Maine, B. S., Forestry, '26; Yale School of Forestry, M. S. F., '28.	Forester, Seal Harbor, Maine.	New England Section
Coombs, George Martin N. Y. State College of Forestry, B. S. Degree in Forestry, '31.	Time-keeper, 33 Lanier Lane, Bay Shore, L. I., N. Y.	New York Section
Cordts, Frank R. 1st yr. at Conn. Agri. Col., 1924-25; N. Y. State Col. of Forestry, B. S., '28.	Lakeville, Wayne Co., Penn.	Allegheny Section
David, William Paul Univ. of Ga., B. S. F., '31.	Student Assistant, Superior Pine Products, Fargo, Ga.	Southeastern Section
Fox, G. K. Cincinnati High School, Cincinnati, N. Y.; N. Y. State College of Forestry; Syracuse University, B. S. F., '28.	District Ranger in Forest Service, Siskiyou District of the Klamath National Forest.	California Section
Furniss, Livingston Waverly High, N. Y., '26; N. Y. S. Col. of Forestry, B. S. F., '31.	Entomologist, 2630 College Avenue, Berkeley, Calif.	California Section
Garrison, Paul M. Mich. State Col., E. Lansing, Mich.; 2 2/3 yrs. Iowa State Col., Ames, Io.	Forester, Great Southern Lbr. Co., Bogalusa, La.	Gulf States Section
Greenhouse, Samuel N. Y. State College of Forestry, B. S., '31.	Foreman, Balso Wood Co., 158 Pioneer St., Brooklyn, N. Y.	New York Section
Huberman, Morris A. Mich. State Col., E. Lansing, B. S. F., '31.	Field Assistant, Southern For. Exp. Sta., New Orleans, La.	Gulf States Section
Humphrey, Merwin W. Cornell University, B. A., '26; Yale School of Forestry, M. F., '31.	Forest Guide and Woodsman, N. Y. State Conservation Dept., Albany, N. Y.	New York Section
Janzen, Daniel H. Oregon Station College School of Forestry, B. S. Degree, '24-'29.	Jr. Forester, Bureau of Biological Survey, Washington, D. C.	Washington Section
Nelson, William E. Univ. of California, B. S. F., '30.	J. F., Sierra National Forest, North Fork, Calif.	California Section

<i>Name and Education</i>	<i>Title and Address</i>	<i>Proposed by</i>
Robe, H. O. San Diego High School; Oregon State, three years Forestry School.	Assistant Ranger, Big Bear District, San Bernardino Forest.	California Section
Snider, Hobart I. Canton High School, Canton, Ill.; University of Minnesota.	District Ranger, Truckee District, Tahoe National Forest.	California Section
Thieme, Herman L., 3rd N. Y. State Col. of Forestry, B. S., '31.	8909 181 St., Jamaica, L. I., N. Y.	New York Section
Wilm, Harold Gridley Needham High School, Needham, Mass., '23; Realgymnasium, Leipzig, Germany, '25; Boston University, '26; Colorado College, '29; Cornell University, M. F., '30.	Instructor in Forest Research and Assistant Silviculturist at Agricultural Experiment Station, Cornell University.	New York Section
Woodford, Albert J. Ithaca High School; Cornell University, B. S. F.	Assistant District Forester, N. Y. State Conservation Dept.	New York Section
Wriston, Emory Nelson 2 Summer School Courses; Marshall College, '99 and 1900 graduated. 1 Summer term, W. Va. Wesleyan.	State Forest Lecturer of W. Va., Kingston, W. Va.	Allegheny Section

FOR ELECTION TO SENIOR MEMBERSHIP

Bedard, Paul William N. Y. State College of Forestry (Syracuse U.), '26, B. S.; Yale Univ. S. of F., '29, M. F. (Junior member, 1927).	Chief of Control, Abitibi Power Co., Iroquois Falls, Ont., Can.	New York Section
Dudley, Ernest Griswold Stanford University, B. A., '08; Yale Forest School, '10. (Junior member, 1919).	Member State Board of Forestry, Exeter, Calif.	California Section
Harper, V. L. U. of Calif., B. S., '26; M. S., '27. (Junior member, 1927).	Member of Staff, Sou. Forest Experiment Station, Naval Stores Branch, Starke, Fla.	Southeastern Section
Lufburrow, B. M. Univ. Ga., B.S.F., '14. (Junior member, 1924).	State Forester of Ga., Atlanta, Ga.	Southeastern Section
Sanford, Burnett Palo Alto High School, '09; Stanford University, '13; University of California, '31, B. S. (Junior member, 1921).	Forest Technician, Calif. State Division of Forestry, Sacramento, Calif.	California Section
Turner, Spence D. Univ. of S. California, '12. (Junior member, 1927).	County Forester and Fire Warden, County of Los Angeles, Los Angeles, Calif.	California Section
Winters, Robert Kirby Univ. of Mich., B. S. F.; M. S. F., '25; Univ. of Mich., Ph. D., '30. (Junior member, 1926).	In charge, Growth and Yield Study, Delta Hardwood Region, Mississippi River, Sou. Forest Experiment Station, New Orleans, La.	Gulf States Section

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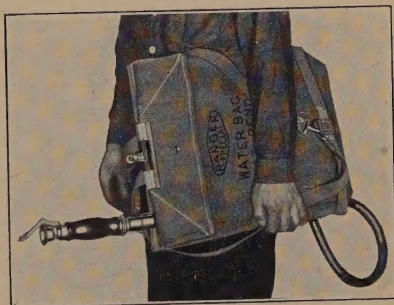
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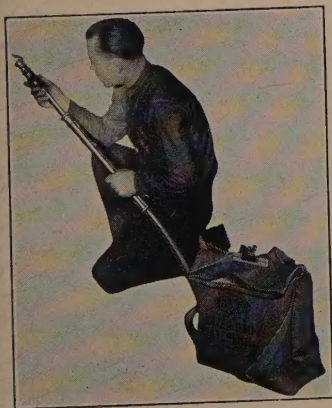


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